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ABSTRACT

This report contains national trend and predictor data for the attrition of teachers from public schools. Data come from three large, national probability samples of teachers taken over 6 school years between 1987 and 1995. Data are based on questionnaire reports of teachers from the Public School Teacher Questionnaires of the Schools and Staffing Surveys (SASS) and the associated Teacher Followup Surveys (a 1-year longitudinal component of the SASS). School attrition is subdivided into four components: teachers who voluntarily moved to different schools; teachers who moved to different schools through involuntary assignment; teachers who voluntarily left teaching altogether; and teachers who left teaching involuntarily through personnel action, or who retired. Summary results are presented in two sections. A section on trends in school attrition focuses on school transfer, exit attrition, reasons for school transfer, and reasons for exit attrition. A section on predictors of school attrition focuses on: situational variables predictive of school attrition; teacher characteristics predictive of school attrition; working condition variables predictive of school attrition; teacher judgment variables predictive of school attrition; followup year variables associated with school attrition; reduced logistic regression models of voluntary moving, voluntary leaving, involuntary moving, and involuntary leaving; reduced logistic regression models using teacher career judgements; reduced regression models using administrative support; and full logistic regression models contrasting attrition components. (Contains 17 references.) (SM)

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RETENTION AND ATTRITION OF TEACHERS AT THE SCHOOL LEVEL: NATIONAL TRENDS AND PREDICTORS[1]

Data Analysis Report No. 1999-DAR1

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TABLE OF CONTENTS

Page

Data Analysis Reports ii

Table of Contents iii

List of Tables v

List of Figures vii

Introduction 1

Summary Results 5

Trends in School Attrition 5

1. School Transfer 5
2. Exit Attrition 5
3. Reasons for School Transfer 5
4. Reasons for Exit Attrition 5
5. Summary of School Attrition 6

Predictors of School Attrition 6

6. Situational Variables Predictive of School Attrition 6
7. Teacher Characteristic Variables Predictive of School Attrition 7
8. Working Condition Variables Predictive of School Attrition 7
9. Teacher Judgment Variables Predictive of School Attrition 7
10. Follow-Up Year Variables Associated with School Attrition 8
11. Reduced Logistic Regression Model of Voluntary Moving 8
12. Reduced Logistic Regression Model of Voluntary Leaving 9
13. Reduced Logistic Regression Model of Involuntary Moving 10
14. Reduced Logistic Regression Model of Involuntary Leaving 11
15. Reduced Logistic Regression Models Using Teacher Career Judgments . . 12
16. Reduced Logistic Regression Models Using Administrative Support 12
17. Full Logistic Regression Models Contrasting Attrition Components 13
18. Summary of Predicting School Attrition 13

Tables 15

References 32

Appendices

A. Data Analysis Methods 34

Data Sources 34

Public School Teacher Questionnaire: Schools and Staffing Surveys 34
Teacher Follow-up Survey: Schools and Staffing Surveys 34
Sources of the Community Type Variable 35

Teacher Sample 35

Procedures 36

Descriptive Trends in School Attrition: Tables 1 - 3 36
Logistic Regression of School Attrition: Tables 4 - 12 36

B. Glossary 43

LIST OF TABLES

Page

I. Trends in School Attrition

Table 1. Retention and Attrition of Teachers at the School Level: National Percentage Estimates for Public School Teachers For Three School Years Combined (1988-89, 1991-92, and 1994-95) . . . 15

Table 2. Main Reasons for School Transfer as a Function of Mover Status: National Estimates of the Percentages of Public School Movers For Three School Years Combined (1988-89, 1991-92, and 1994-95) . . . 16

Table 3. Main Reasons for Exit Attrition: National Estimates of the Percentages of Public School Leavers For Three School Years Combined (1988-89, 1991-92,and 1994-95) 17

II. Predictors of School Attrition

Table 4. Situational Variables Predictive of Public School Attrition of Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95) 18

Table 5. Teacher Characteristic Variables Predictive of Public School Attrition of Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95) 19

Table 6. Teacher Working Condition and Career Judgment Variables Predictive of Public School Attrition of Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95) 20

Table 7. Teacher Follow-Up Variables Predictive of Public School Attrition of Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95) . . 21

Table 8. Predicting Public School Attrition of Teachers Nationally: Full Logistic Regression Models for Three School Years Combined (1988-89, 1991-92, and 1994-95) 22

Table 9. Predicting Public School Attrition of Teachers Nationally: Reduced Logistic Regression Models for Three School Years Combined (1988-89, 1991-92, and 1994-95) . . 24

Table 10. Including Teacher Career Judgments in the Prediction of Public School Attrition of Teachers Nationally: Reduced Logistic Regression Models for Three School Years Combined (1988-89, 1991-92, and 1994-95) 26

Table 11. Including Administrative Support Perceptions in the Prediction of Public School Attrition of Teachers Nationally: Reduced Logistic Regression Models for Two School Years Combined (1988-89 and 1994-95) 28

Table 12. Full Logistic Regression Models Contrasting Four School Attrition Components of Public School Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95) . . . 30

LIST OF FIGURES

Figure 1. Logistic Regression Framework I 4

Figure 2. Logistic Regression Framework II 4

8

INTRODUCTION[1]

This report contains national trend and predictor data for the attrition of teachers from public schools (henceforth simply referred to as "school attrition"). The attrition of teachers at the school level is of particular concern for maintaining continuity in, and quality of, schools' instructional programs. In terms of school finance, instructional salaries and benefits represent 57% of public school expenditures--the single largest investment of school resources (Snyder, Hoffman, & Geddes, 1997).

National data indicate that, every year, about 13% of all public school teachers (and 18% of private school teachers) leave their school of employment, either to transfer as teachers to other schools or to leave teaching employment altogether (Whitener, Gruber, Lynch, Tingos, Perona, & Fondelier, 1997). A large number of these public school teachers leave voluntarily. About 65% of teachers who move to other schools, and 63% of those who leave teaching employment, do so voluntarily (Boe, Bobbitt, Cook, Barkanic, & Maislin, 1998). A better understanding of factors contributing to school attrition--especially factors under policy and administrative control--might be useful in designing more effective strategies for retaining at the school level (i.e., through reduced attrition) the instructional resource represented by experienced teachers.

In contrast with a previous report on the attrition of teachers at the school level (Ingersoll, Han, & Bobbitt, 1995), this report (a) is based on the questionnaire reports of teachers instead of on reports by their school principals, (b) subdivides school attrition into four components instead of one overall index, and (c) provides logistic regression analyses of predictor variables for each of four components of school attrition. A related "Data Analysis Report" issued by the Center for Research and Evaluation in Social Policy, Graduate School of Education, University of Pennsylvania (Boe et al., 1998), provides more extensive descriptive data on trends in teacher turnover, including the transfer of teachers from one main teaching assignment to another.

The data for this study were derived from three large national probability samples of teachers taken over a six-year period for school years 1987-89, 1990-92, and 1993-95. Thus, the trend and predictive data reported are based on the numbers of nationally estimated teachers in public schools. The main data sources were the Public School Teacher Questionnaires of the Schools and Staffing Surveys (SASS), and the associated Teacher

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[1]See Appendix B (Glossary) for definitions used in this report.

Follow-up Surveys (TFS), a one-year longitudinal component of SASS. These data were collected by, and are available from, the National Center for Education Statistics (NCES), U.S. Department of Education. Data sources, the teacher sample, and data analysis procedures are described in Appendix A: Data Analysis Methods.

The descriptive data on school attrition for Tables 1 through 3 are based on the Public School Teacher Questionnaires of SASS and two TFS questionnaires. In one of the TFS questionnaires, currently employed teachers during a particular school year (a TFS year) were asked about their status during the prior year (a SASS year) such as whether they taught in a different school. In a different TFS questionnaire, previously employed teachers during one year (a TFS year) who had left teaching at the end of the prior year (the SASS year) were identified and asked about the circumstances of their leaving the ranks of employed teachers. From answers to questions of this type, it is possible to define the following four components of school attrition[2]:

1. Teachers who voluntarily moved to a different school,
2. Teachers who moved to a different school through involuntary assignment,
3. Teachers who voluntarily left teaching altogether, and
4. Teachers who left teaching involuntarily through personnel action, or who retired.

Data on these four aspects of school attrition are presented in Tables 1 through 3.

The predictive data on school attrition for Tables 4 through 12 are also based on Public School Teacher Questionnaires of SASS and the TFS questionnaires. In the TFS questionnaires, continuing and former teachers were asked about (a) situational variables (such as main teaching assignment by subject matter and level, community type, and region), (b) their characteristics (such as age, gender, race, marital status, certification status, and educational background), (c) their working conditions (such as employment status, salary, minority enrollment), (d) their judgments about future plans and school climate, (e) changes in status from one year to the next (such as change in marital status, number of dependents, employment status, and family income). Logistic regression analyses, as presented in Tables 4 through 12, provide information about both the unadjusted and adjusted associations of such predictor variables with each of the four components of school attrition.

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[2]The bases for distinguishing between voluntary and involuntary moving and leaving are described in paragraphs numbered 3 and 4 under the section "Trends in School Attrition" on page 5.

The framework for analyses of the predictors of the four components of school attrition is depicted in Figure 1. Each component of school attrition in Figure 1 was analyzed separately because prior analyses demonstrated that the four components were quite different when contrasted with each other, as depicted in Figure 2.

Figure 1:LOGISTIC REGRESSION FRAMEWORK I

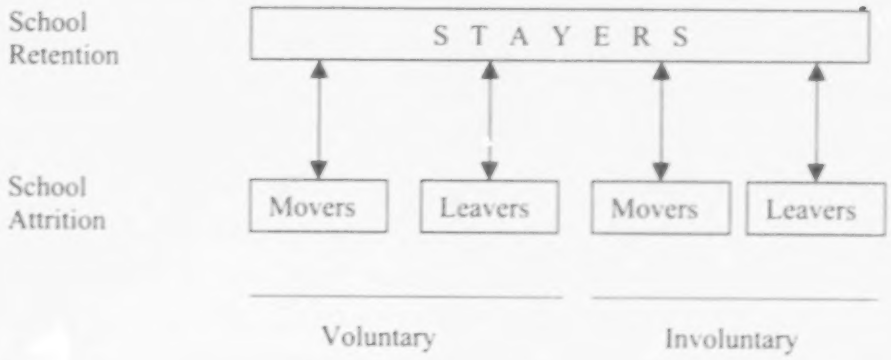
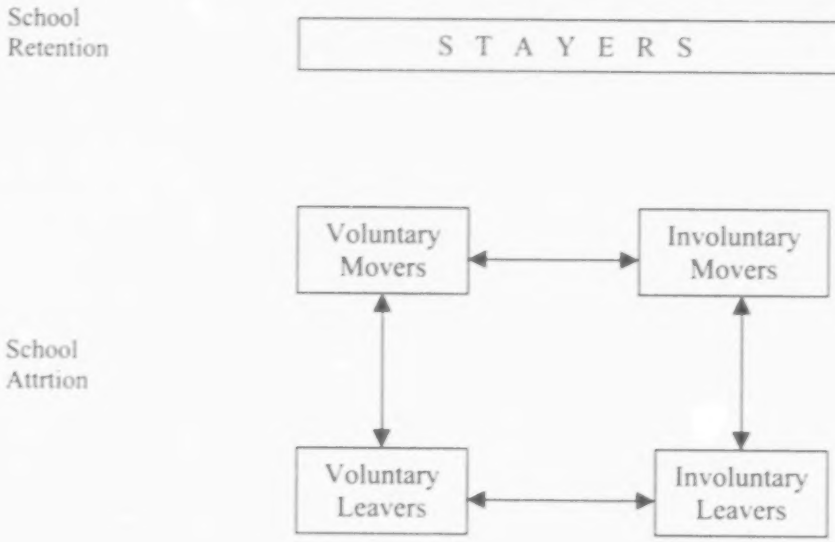


Figure 2: LOGISTC REGRESSION FRAMEWORK II



SUMMARY RESULTS[1]

All group differences and trends over time discussed and interpreted in the results described below are statistically significant at least at the .05 level. The exact probability level of many comparisons and trends are reported in the tables of results presented in this report. All findings pertain to public school teachers.

Trends in School Attrition

1. School Transfer: School transfer of teachers from one year to the next (reassignment among schools within districts and migration to schools in other districts, combined) has been reasonably stable at about 7% of all employed teachers annually during the six year period from 1987-88 to 1993-94. Annual reassignment percentages of about 4% have consistently been higher than migration percentages of about 3%. (See Table 1.)
2. Exit Attrition: Exit attrition of public school teachers from one year to the next has been fairly stable averaging about 6% of total teachers annually during the six year period from 1987-88 to 1993-94. (See Table 1.)
3. Reasons for School Transfer: The reasons for school transfer depend upon the type of transfer, viz. voluntary or involuntary. For example, over 50% of school reassignment within the same public school district was involuntary (i.e., due to a staffing action) while only 13% of teacher migration between school districts was involuntary. By contrast, almost 50% of between-district migration was due to teachers' personal reasons, while only 15% of within-district assignment was for personal reasons. (See Table 2.)
4. Reasons for Exit Attrition: The main reasons for leaving teaching depend upon the type of leaving, viz. voluntary versus involuntary.[3] For example, the main reason for involuntary leaving was retirement (27.5% in 1993-94), while the main reason for voluntary leaving was for personal or family reasons (31.0% in 1993-94). Contrary to what might be thought, only 18.5% of leavers did so for other work or better salary and only 5.4% left mainly because they were dissatisfied with teaching. Though there were

[3]For the purposes of this study, retirement, poor health, and staffing action constituted the definition of involuntary leaving even though retirement decisions by teachers are not, literally, involuntary in the specific year in which they are made. However, retirement is a major category that differs greatly from the various reasons used to define voluntary leaving. As will become apparent in the analyses reported below, involuntary leaving (which includes retirement) is very sharply distinguished empirically from the other components of school attrition. In addition, a subsequent parallel study is in progress on a multivariate analysis of teacher retirement alone.

some statistically significant differences in the reasons for leaving year-by-year, there were no major systematic trends. (See Table 3.)

5. Summary of School Attrition. There has been a fairly high level of school attrition in the public school teaching force: about 7% movers and 6% leavers, for a total of 13%. An average of almost 330,000 teachers out of a teaching force of almost 2,500,000 teachers leave their school of employment annually. Of these 330,000 teachers, 63% leave voluntarily (for personal or family reasons, to take other employment, etc.) while the other 37% leave involuntarily (due to staffing actions, health reasons, and retirement). With much of involuntary school attrition initiated at the discretion of school districts, it is reasonable to assume that much of it has been for constructive reasons such as placing teachers in assignments in other schools where they are better qualified and/or needed, and dismissing ineffective teachers. With this amount of school attrition, it is certainly understandable that great difficulties have been encountered in filling positions with qualified teachers, and then retaining them to create a stable and qualified school faculty.

Predictors of School Attrition

Except for analyses of the "administrative support" predictor variable (see paragraph 16 below), all regression analyses were performed with the three SASS/TFS waves combined (1988-89, 1991-92, and 1994-95). As described in more detail in the "Procedures" section of Appendix A, the combination of the three waves of TFS increased sample size sufficiently to make possible both the detailed analyses of variables described below and the incorporation of the "wave" variable into the various analyses as one more predictor variable.

6. Situational Variables Predictive of School Attrition: Odds ratios for the bivariate association of each situational variable with each of the four school attrition variables are shown in Table 4. Except for the community type variable, at least one level of each of these situational variables was associated with one or more types of school attrition at the .05 level of statistical significance. In general, the associations of all levels of the situational variables with the three types of teacher turnover were modest in that only two odds ratio were greater than 2.00 and none less than 0.50. In particular, it should be noted that none of the four components of school attrition was associated to a substantial degree with SASS/TFS year. The odds ratios ranged from only 0.73 to 1.37, and there was no evidence of a substantial systematic trend in turnover during the years from 1987-89 to 1993-95.

7. Teacher Characteristic Variables Predictive of School Attrition: Odds ratios for the bivariate association of each teacher characteristic variable with each of the four school attrition variables are shown in Table 5. At least one level of each of these teacher characteristic variables was associated with one or more of the four components of school attrition at the .05 level of statistical significance. By examining the "Percent" columns, it can be seen that voluntary moving and voluntary leaving were both a sharply declining function of increasing teacher age and teaching experience. These two components of school attrition were most often observed among partly certified teachers and among teachers who were not given a teaching assignment in their best qualified area. Involuntary movers were also a declining function of age and years of teaching experience. By contrast, the age and teaching experience functions for involuntary leavers were quite different because the predominant group of involuntary leavers were retirees (see Table 3) who would appear in the oldest age category (52-89 years). Involuntary leaving was at a low level during the 29-51 year age range, and was quite high beyond 51 years. Similarly, involuntary leaving was quite low for teachers with 3 - 22 years of teaching experience, and much higher for teachers with more than 22 years of experience. And probably related to teacher age, involuntary leaving was relatively high for teachers with no dependent children and relatively low for teachers with at least one dependent child.
8. Working Condition Variables Predictive of School Attrition: Odds ratios for the bivariate association of each working condition variable with each of the four school attrition variables are shown in Table 6. At least one level of each these working condition variables was associated with one or more components of school attrition at the .05 level of statistical significance. The "Percent" columns show that voluntary moving and voluntary leaving were a sharply declining function of increasing teacher salary. In addition, voluntary leaving and involuntary moving occurred more often for teachers employed in irregular and/or part-time positions. Involuntary leaving, however, was not strongly associated with any working condition variables. This is not surprising since most involuntary leavers are retirees.
9. Teacher Judgment Variables Predictive of School Attrition: Odds ratios for the bivariate association of each teacher career judgment variable with each of the four school attrition variables are also shown in Table 6. Each of these teacher judgment variables was associated with at least one or more components of school attrition at the .001 level of statistical significance. As might be expected, the "Percent" columns indicate that all

four components of school attrition were characterized by teachers who reported that they planned to leave their school of employment during the following year (the year following a SASS year). Similarly, voluntary movers, voluntary leavers, and involuntary leavers were characterized by teachers who reported that they planned to leave teaching altogether. Though these "teacher plans" recorded in the SASS years are strongly associated with voluntary moving, voluntary leaving, and involuntary leaving, it is surprising that teacher plans for the following year are not even more predictive of future employment intentions. For example, the results of a subsidiary analysis (to those reported in the tables) has shown that only 15.3% of teachers who actually left teaching voluntarily reported less than six months earlier that was their intention. Thus, there is not a close correspondence between teacher's plans to move to a different school or to leave teaching, and what they actually do.

10. Follow-up Year Variables Associated with School Attrition: Odds ratios for the bivariate association of each follow-up year variable with each of the four school attrition variables are shown in Table 7. At least one level of each of these follow-up year variables was associated with one or more components of school attrition at the .001 level of statistical significance. The "Percent" columns show that voluntary moving and voluntary leaving were most often observed among teachers who were recently married and had recently earned a degree. One detrimental consequence of mobility was that voluntary movers were almost three times more likely to have changed from being fully certified to partly certified in their new main teaching assignment than to have had no change in certification status. Voluntary leaving was most strongly related to a change from no dependents in the SASS year to one or more dependents during the following TFS year, while involuntary moving was most strongly related to a change from part- to full-time employment. Finally, involuntary leavers were (a) much less likely to be enrolled in a degree program, (b) much less likely to change from no dependents in the SASS year to one or more dependents in the TFS year, (c) much less likely to change from part-to full-time employment, and (d) much more likely to have experienced a decrease in income. All these characteristics of involuntary leavers might be expected because almost 75% of them were retirees.

11. Reduced Logistic Regression Model of Voluntary Moving: The full logistic regression model of Table 8 for voluntary movers was reduced to the model of Table 9 without appreciable loss of predictive power (as indicated by the *c* index) or goodness-of-fit. Therefore, the odds ratios of Table 9 provide a basis for explaining how voluntary movers

differed from stayers under the statistically controlled conditions of the reduced logistic regression model. In comparison with stayers, voluntary movers were (a) nearly three times as likely to have changed from being fully certified to partly certified from one year to the next, in comparison with no change in certification status, (b) somewhat more likely to have recently earned a degree (than not), (c) somewhat more likely to have had a principal who did not enforce rules (than have one who did), (d) somewhat more likely to have two or more breaks in prior teaching service (than none), and (e) somewhat more likely to have experienced a decrease in family income (than no change). In addition, voluntary movers were more likely to have been employed in the West, South, and Midwest, than in the East. By computing the reciprocal of odds ratios less than 1.0 (see Appendix B), a number of comparisons can be made of stayers with voluntary movers. Thus, in comparison with voluntary movers, stayers were over seven times more likely to be in the oldest age category than in the youngest age category. The *c* index of 0.713 for the reduced regression model containing these seven predictor variables indicates moderate predictive power. In addition, this model satisfies the Hosmer-Lemeshow goodness-of-fit (GOF) test ($p > .20$). Under the statistically controlled conditions of the model, it is also important to recognize which predictor variables did not appreciably add to its predictive power or improve its fit. For instance, teaching field, teaching level, degree level, community type, sex, race/ethnicity, and SASS/TFS year were not sufficiently associated with the school attrition variable of voluntary movers versus stayers to be helpful in predicting which teachers will move voluntarily to a different school and which will stay in the same school during the next year.

12. Reduced Logistic Regression Model of Voluntary Leaving: The full logistic regression model of Table 8 for voluntary leavers was reduced to the model of Table 9 without appreciable loss of predictive power (the *c* index) or goodness-of-fit. Therefore, the odds ratios of Table 9 provide a basis for explaining how voluntary leavers differed from stayers under the statistically controlled conditions of the reduced logistic regression model. In comparison with stayers, voluntary leavers were (a) more than four times as likely to have changed from no dependent child during one year to at least one dependent child during the next year, in comparison with having no change in child dependency status, (b) well over two times as likely to have experienced a decrease in family income than no change in family income, and (c) almost two times more likely to have recently earned a degree during the past year than not to have done so. By computing the reciprocal of odds ratios less than 1.0 (see Appendix B), a number of comparisons can

be made of stayers with voluntary leavers. Thus, in comparison with voluntary leavers, stayers were (a) more than twice as likely to be employed as regular full-time teachers rather than as irregular and/or part-time teachers, and (b) over four times more likely to be in the two oldest age quintiles than in the youngest age quintile. More generally, voluntary leavers tend to leave teaching employment following changes in their personal lives such as acquiring dependent children or earning a degree recently, while stayers tend to be older with regular full-time teaching jobs. The *c* index of 0.734 for the reduced regression model containing these five predictor variables indicates moderate predictive power. In addition, this model satisfies the GOF test ($p > .20$). Under the statistically controlled conditions of the model, it is also important to recognize which predictor variables did not appreciably add to its predictive power or improve its fit. For instance, teaching field, teaching level, degree level, certification status, community type, sex, race/ethnicity, and SASS/TFS year were not sufficiently associated with the school attrition variable of voluntary leavers versus stayers to be helpful in predicting which teachers will leave teaching voluntarily during the next year and which will stay in the same school.

13. Reduced Logistic Regression Model of Involuntary Moving: The full logistic regression model of Table 8 for involuntary movers was reduced to the model of Table 9 without appreciable loss of predictive power (the *c* index) or goodness-of-fit. Therefore, the odds ratios of Table 9 provide a basis for explaining how involuntary movers differed from stayers under the statistically controlled conditions of the reduced logistic regression model. In comparison with stayers, involuntary movers were about 1.8 times more likely to have changed from being fully certified to partly certified from one year to the next, in comparison with no change in certification status. By computing the reciprocal of odds ratios less than 1.0 (see Appendix B), a number of comparisons can be made of stayers with involuntary movers. Thus, in comparison with involuntary movers, stayers were (a) over three times more likely to have over 22 years of teaching experience than only one or two years of such experience, (b) over three times more likely to have held regular full-time employment instead of irregular and/or part-time employment, and (c) 1.7 times more likely to have changed from no dependent child during one year to at least one dependent child during the next year, than to have no change in child dependency status. The *c* index of 0.659 for the reduced regression model containing these four predictor variables indicates modest predictive power. In addition, this reduced model satisfies the GOF test ($p > .20$). Under the statistically controlled conditions of this model, it is also

important to recognize which predictor variables did not appreciably add to its predictive power or improve its fit. For instance, teaching field, teaching level, degree level, community type, sex, race/ethnicity, marital status, and SASS/TFS year were not sufficiently associated with the school attrition variable of involuntary movers versus stayers to be helpful in predicting which teachers will move involuntarily to a different school and which will stay in the same school during the next year.

14. Reduced Logistic Regression Model of Involuntary Leaving: The full logistic regression model of Table 8 for involuntary leavers was reduced to the model of Table 9 without appreciable loss of predictive power (the *c* index) or goodness-of-fit. Therefore, the odds ratios of Table 9 provide a basis for explaining how involuntary leavers differed from stayers under the statistically controlled conditions of the reduced logistic regression model. In comparison with stayers, involuntary leavers were (a) over nine times more likely to be in the oldest age quintiles than in the youngest age quintile, (b) almost four times more likely to have experienced a decrease in family income than no change in family income, and (c) about 1.8 time more like to be married than never married. By computing the reciprocal of odds ratios less than 1.0 (see Appendix B), a number of comparisons can be made of stayers with involuntary leavers. Thus, in comparison with involuntary leavers, stayers were (a) over four time more likely to have 3 to 22 years of teaching experience than to have only one or two years of teaching experience, (b) four times more likely to have changed from part- to full-time employment than any other employment status, and (c) more than twice as likely to have changed from having a dependent child during one year to no dependent children during the next year than to have no change in child dependency status. More generally, involuntary leavers tend to leave teaching employment upon attaining retirement age. The *c* index of 0.871 for the reduced regression model containing six predictor variables indicates strong predictive power. In addition, this reduced model satisfies the GOF test ($p > .20$). Under the statistically controlled conditions of this model, it is also important to recognize which predictor variables did not appreciably add to its predictive power or improve its fit. For instance, teaching field, teaching level, degree level, certification status, community type, sex, race/ethnicity, and SASS/TFS year were not sufficiently associated with the dependent variable of involuntary leavers versus stayers to be helpful in predicting which teachers will leave teaching involuntarily during the next year and which will stay teaching in the same school during the next year.

15. Reduced Logistic Regression Models Using Teacher Career Judgments: As shown in Table 6, there were strong bivariate relationships between each of the four components of school attrition and teacher plans regarding moving or leaving. However, as stated in paragraph 2 of the "Procedures" section of Appendix A (pg. 36), these variables might obscure the effects of policy-relevant variables, and were therefore held back until the final stage of fitting logistic regression models. Reduced logistic regression models of the four components of school attrition with the teacher career judgment variables included are presented in Table 10. The results show that the variable "stay school" is highly associated with three components of school attrition. More specifically, plans to stay in the same school next year are associated with actual staying, and plans to leave the school are associated with voluntary moving, voluntary leaving, and involuntary leaving. In comparison with the reduced models of Table 9 which excluded "stay school," the c indices are from 0.08 to 0.11 units higher for these three components of school attrition. Therefore, the prediction of school attrition can be enhanced greatly by the inclusion of "stay school." However, it is of no use in the development of policies or administrative actions that might lead to improved school retention of voluntary movers and voluntary leavers.

16. Reduced Logistic Regression Models Using Administrative Support: Lack of administrative support has been linked to teacher attrition in several reviews of research literature (Billingsley, 1993; Brownell & Smith, 1992; Darling-Hammond & Sclan, 1996). However, prior studies by other investigators have not included the administrative support variable in a multivariate model of teacher attrition. Teacher perceptions of administrative support were not included in our full or reduced logistic regression models of Tables 8 or 9 because such perceptions were not collected by the Public School Teacher Questionnaire for the 1990-92 SASS/TFS. All analyses for Tables 8 and 9 were performed on all three SASS/TFS years combined. To explore the association of teachers' perceptions of administrative support with school attrition, additional analyses were made with data combined for the 1987-89 and 1893-95 SASS/TFS years. The full logistic regression models for each of the four components of school attrition of Table 8 were first rerun with administrative support included. These were reduced to the models of Table 11 without appreciable loss of predictive power (the *c* index) or of goodness-of-fit. When analyzed in this way, "administrative support" was associated with voluntary moving, voluntary leaving, and involuntary moving (but not with involuntary leaving). Specifically, in comparison with voluntary leavers, stayers were almost four times more likely to

perceive strongly school administrators' behavior as supportive and encouraging than to have the opposite view of administrative behavior (OR = 0.29). A similar statement can be made for stayers compared with voluntary leavers, but at a weaker level (OR = 0.55). Thus, there is clear evidence that, under these statistically controlled conditions, good administrative support is associated with the retention of teachers in the school of their employment.

17. Full Logistic Regression Models Contrasting Attrition Components: As depicted in Figure 2, the four components of school attrition were contrasted with each other by means of logistic regression using the full array of predictor variables selected through the process described in step 5 of the logistic regression procedure described on page 41 of Appendix A. The results of the four logistic regression analyses are reported in Table 12. The main purpose of these analyses was to determine whether the four components of school attrition were sufficiently different from each other to justify performing the separate analyses shown in Tables 8 and 9. Overall, the *c* indices for the four models reported in Table 12 were sufficiently high (from 0.68 - 0.90) to conclude that the four components of school attrition should be analyzed separately instead of combined into one attrition variable. Since the analyses shown in Table 12 satisfied their main purpose, refined and reduced models that satisfied the GOF test were not constructed. However, the interested reader can readily ascertain which predictor variables account for much of the differences in the components of teacher attrition by examining the odds ratios of Table 12.

18. Summary of Predicting School Attrition: As shown in Tables 4 through 7, a considerable number of predictor variables, taken one at a time, were associated with each of the four components of school attrition--voluntary moving, voluntary leaving, involuntary moving, and involuntary leaving. The independent contributions of these predictor variables (i.e., with redundancy among these variables statistically removed) to explain school attrition is most parsimoniously understood from the reduced logistic regression models of Table 9. What has emerged from these analyses is that different explanations for each of the four components of school attrition are needed, thereby demonstrating that each is a quite distinctive phenomenon. The main findings are summarized as follows:

    - The reduced multivariate model for voluntary moving has moderate predictive power. In comparison with stayers, voluntary movers were over twice as likely to have lost full certification than to have no change in certification status, and to be much younger.

- The reduced multivariate model for voluntary leaving has moderate predictive power. In comparison with stayers, voluntary leavers were more than four times as likely to have changed from a condition of no dependents to at least one dependent in comparison with no change in dependents, over twice as likely to be employed as an irregular and/or part-time teacher than as a regular full-time teacher, and to be much younger.

- The reduced multivariate model for involuntary moving has modest predictive power. In comparison with stayers, involuntary movers were more than three times as likely to be employed as an irregular and/or part-time teacher than as a regular full-time teacher, and to have much less teaching experience.

- The reduced multivariate model for involuntary leaving has strong predictive power. In comparison with staying, involuntary leaving could be subdivided into two categories: those who left after age 51 (mostly as retirees) and those who left with 3 to 22 years of teaching experience (mostly due to staffing action and poor health). In further comparison with stayers, involuntary leavers were characterized by decreased income, a change toward part-time employment, and a change from some to no dependents.

The variable of "administrative support" was also examined in a set of special multivariate analyses. In comparison with staying, the voluntary moving by teachers to a different school was clearly associated with less perceived administrative support--as was voluntary leaving and involuntary moving (but both to a lesser extent than voluntary moving).

Table 1. *Retention and Attrition of Teachers at the School Level: National Percentage Estimates for Public School Teachers for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

		Retention and Attrition Following Three School Years			
Teacher Status	Statistic[a]	1987-88	1990-91	1993-94	Total
School Retention[b]	Column %	86.5%	87.6%	86.3%	86.8%
	Standard Error %	0.5%	0.5%	0.5%	0.3%
School Attrition[b]					
A. School Reassignment: Same District	Column %	4.5%	4.3%	4.3%	4.4%
	Standard Error %	0.3%	0.3%	0.3%	0.2%
B. School Migration: Different District	Column %	3.4%	3.0%	2.8%	3.1%
	Standard Error %	0.3%	0.3%	0.3%	0.2%
C. Exit Attrition	Column %	5.6%	5.1%	6.6%	5.8%
	Standard Error %	0.3%	0.4%	0.4%	0.2%
Total School Attrition	Column %	13.5%	12.4%	13.7%	13.2%
	Standard Error %	0.5%	0.5%	0.5%	0.3%
Total Teachers	Column %	100%	100%	100%	100%
	National Estimate	2,381,022	2,541,863	2,538,841	7,461,726
	Sample (n)	4,798	4,740	4,503	14,041

Note. Data from the 1987-88, 1990-91 and 1993-94 Schools and Staffing Surveys and the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]Nationally weighted percentages (Column %) of the total number of full-time and part-time teachers at the elementary and secondary levels. Totals may not sum exactly due to rounding. Standard Error % = standard error of the column percentages. National Estimate = nationally weighted estimates of the total number of teachers.

[b]The school retention/attrition components by school year (4 x 3) χ^2 is 13.76 ($p < .05$).

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Table 2. *Main Reasons for School Transfer as a Function of Mover Status: National Estimates of the Percentages of Public School Movers for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Reasons for Moving	Statistic[a]	Type of School Transfer* (1988-89, 1991-92, and 1994-95 Combined) Within District Reassignment	Between District Migration	Total
Voluntary Movers				
A. Better Teaching Assignment	Column %	23.4%	13.3%	19.2%
	Standard Error %	1.7%	1.4%	1.1%
B. Better Salary or Benefits	Column %	1.6%	11.7%	5.8%
	Standard Error %	0.6%	1.1%	0.6%
C. Personal Reasons	Column %	14.8%	48.9%	28.8%
	Standard Error %	1.5%	2.5%	1.4%
D. Dissatisfied with School	Column %	9.2%	13.1%	10.8%
	Standard Error %	0.7%	2.1%	1.0%
Subtotal: Voluntary	Column %	49.0%	87.0%	64.6%
	Standard Error %	2.3%	1.7%	1.5%
Involuntary Movers (Staffing Action)	Column %	51.1%	13.0%	35.4%
	Standard Error %	2.3%	1.7%	1.5%
Total Movers	Column %	100%	100%	100%
	Nat'l Estimate/Yr	108,191	75,809	184,000
	Sample (n)	1,581	1,691	3,272

Note. Data from the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]Nationally weighted column percentages (Column %) of the total number of full-time and part-time movers combined at the elementary and secondary levels. Totals may not sum exactly due to rounding. Standard Error % = standard error of the column percentages; Nat'l Estimate/Yr = the mean nationally weighted estimate of the total number of movers for years 1988-89, 1991-92, and 1994-95.

*The reason for moving by mover status (5 x 2) χ^2 was 252.39 ($p < .001$).

Table 3. *Main Reasons for Exit Attrition: National Estimates of the Percentages of Public School Leavers for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Main Reason for Leaving	Statistic[a]	Exit Attrition Following School Years[c]			
		1987-88	1990-91	1993-94	Total
Voluntary Leavers					
A. Other Work or Better Salary	Column %	17.9%	11.4%	18.5%	16.2%
	Standard Error %	2.3%	1.8%	2.2%	1.2%
B. Personal/Family Reasons	Column %	32.7%	26.6%	31.0%	30.2%
	Standard Error %	3.5%	3.3%	3.2%	2.1%
C. Sabbatical	Column %	5.4%	2.1%[b]	3.4%	3.6%
	Standard Error %	1.5%	0.5%	1.1%	0.7%
D. Take Courses	Column %	4.8%	7.8%	6.7%	6.4%
	Standard Error %	0.7%	1.7%	1.8%	1.0%
E. Dissatisfied	Column %	8.9%	8.3%	5.4%	7.3%
	Standard Error %	1.3%	2.0%	1.1%	0.9%
Subtotal: Voluntary	Column %	69.6%	56.2%	64.9%	63.7%
	Standard Error %	2.7%	3.4%	2.6%	1.8%
Involuntary Leavers					
A. Retirement	Column %	22.3%	30.3%	27.5%	26.8%
	Standard Error %	2.4%	2.6%	2.4%	1.5%
B. Poor Health	Column %	2.2%	3.7%[b]	4.7%	3.6%
	Standard Error %	0.4%	1.5%	1.3%	0.7%
C. Staffing Action	Column %	5.9%	9.8%	3.0%	5.9%
	Standard Error %	0.8%	2.4%	0.6%	0.8%
Subtotal: Involuntary	Column %	30.4%	43.8%	35.2%	36.3%
	Standard Error %	2.7%	3.4%	2.6%	1.8%
Total Leavers	Column %	100%	100%	100%	100%
	National Estimate	132,832	130,282	166,807	429,921
	Sample (n)	1,550	1,456	1,724	4,730

Note. Data from the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]Nationally weighted column percentages (Column %) of the total numbers of full-time and part-time leavers combined at both the elementary and secondary levels. Totals may not sum exactly due to rounding. Standard Error % = standard error of the column percentages. National Estimate = the mean nationally weighted estimate of the total number of leavers for years 1988-89, 1991-92, and 1994-95.

[b]Sample size (n) less than 30.

[c]The reason for leaving by school year (8 x 3) χ^2 was 32.38 ($p < .01$).

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Table 4. *Situational Variables Predictive of Public School Attrition of Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Situational Variables[a]		Movers and Leavers Percentages[b] and Odds Ratios[c]							
		Voluntary Movers		Voluntary Leavers		Involuntary Movers		Involuntary Leavers	
Name	Levels[b]	Percent	OR	Percent	OR	Percent	OR	Percent	OR
Teaching Level	Secondary	4.49%	0.81**	4.10%	1.02	2.59%	0.71***	2.46%	1.09
	Elementary	5.51%		4.02%		3.60%		2.25%	
Teaching Field	General Elementary	5.22%	0.74*	3.60%	0.67*	3.03%	0.68*	2.44%	1.45
	General Secondary	4.76%	0.67**	4.46%	0.84	3.04%	0.68**	2.44%	1.45*
	Other Education	3.69%	0.52***	3.08%	0.57*	2.61%	0.58**	2.34%	1.39
	Special Education	6.92%		5.27%		4.39%		1.69%	
Community Type	Central City	5.39%	1.14	3.90%	0.96	4.06%	1.29	2.26%	0.86
	Rural/Small Town	4.99%	1.05	4.17%	1.03	2.45%	0.77	2.18%	0.83
	Suburban	4.60%		3.95%		3.23%		2.63%	
Region	West	5.75%	2.63***	3.64%	1.18	3.24%	0.81	2.40%	1.05
	South	6.69%	3.09***	4.75%	1.55*	2.69%	0.67**	2.18%	0.95
	Midwest	4.42%	2.00***	4.16%	1.35	2.93%	0.73*	2.60%	1.13
	Northeast	2.27%		3.11%		3.97%		2.30%	
SASS/TFS Wave	1993-1995	4.96%	0.87	4.70%	1.10	2.91%	0.96	2.61%	1.37**
	1990-1992	4.52%	0.79*	3.18%	0.73*	3.42%	1.13	2.50%	1.31*
	1987-1989	5.64%		4.30%		3.04%		1.92%	
Total Teachers	Attrition %	5.03%		4.06%		3.12%		2.35%	
	National Estimate	343,023		273,914		208,976		156,007	
	SE National Estimate	13,099		12,956		9,281		9,309	
	TFS Sample (n)	2,176		2,730		1,096		2,000	

Note. Data from the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]See Glossary for more information about situational variables.

[b]The dependent variables were coded as follows: voluntary movers=1 vs stayers=0; voluntary leavers=1 vs stayers=0; involuntary movers=1 vs stayers=0; involuntary leavers=1 vs stayers=0. The predictor variables were all treated as indicator variables with the lower level listed as the reference category coded as "0." The other (comparision) levels were coded as 1."

[c]Ratio of the odds (OR) of being a mover (vs a stayer) and a leaver (vs a stayer), respectively (*$p<.05$, **$p<.01$, ***$p<.001$). See Glossary for a description of odds ratios.

Table 5. *Teacher Characteristic Variables Predictive of Public School Attrition of Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Teacher Characteristic Variables[a]		Movers and Leavers Percentages[b] and Odds Ratios[c]							
		Voluntary Movers		Voluntary Leavers		Involuntary Movers		Involuntary Leavers	
Name	Levels[b]	Percent	OR	Percent	OR	Percent	OR	Percent	OR
Sex	Female	5.16%	1.10	4.48%	1.52***	3.33%	1.29	2.32%	0.95
	Male	4.71%		2.99%		2.61%		2.43%	
Race/Ethnicity	White, Non-Hisp	4.97%	0.92	4.09%	1.07	2.99%	0.74**	2.31%	0.88
	Non-White	5.41%		3.82%		4.03%		2.62%	
Age (Quintiles)	52 – 89 years	2.21%	0.14***	2.38%	0.22***	2.07%	0.42***	9.84%	9.47***
	43 – 51 years	3.43%	0.23***	2.17%	0.20***	2.54%	0.52***	0.66%	0.58
	37 – 42 years	4.86%	0.32***	3.81%	0.35***	3.11%	0.63***	0.70%	0.61
	29 – 36 years	6.74%	0.46***	6.56%	0.62***	4.44%	0.92	0.50%	0.44
	21 – 28 years	13.62%		10.13%		4.83%		1.14%	
Marital Status	Married	4.70%	0.66***	3.99%	0.82	2.98%	0.75*	2.50%	1.64**
	Prev Married	4.68%	0.66**	3.56%	0.73	3.02%	0.76	2.39%	1.57**
	Never Married	6.98%		4.80%		3.93%		1.54%	
Child Age	Child < 6 years	6.16%	1.08	6.47%	1.46**	3.87%	1.22	0.80%	0.19***
	Child > 5 years	3.92%	0.67***	2.64%	0.57***	2.77%	0.86	1.23%	0.29***
	No Child	5.73%		4.54%		3.19%		4.14%	
Certification	Fully Certified	4.89%	0.69**	3.83%	0.52***	3.02%	0.66***	2.39%	1.34
	Partly Certified	6.89%		7.07%		4.53%		1.80%	
Teaching Exp (Quintiles)	23- 53 years	1.87%	0.17***	2.09%	0.24***	1.87%	0.27***	7.28%	3.36***
	14- 22 years	3.42%	0.30***	2.62%	0.30***	2.36%	0.34***	1.05%	0.45*
	7- 13 years	5.73%	0.53***	5.03%	0.60***	3.76%	0.55***	0.71%	0.30**
	3 – 6 years	9.36%	0.90	6.58%	0.80*	3.91%	0.57**	0.54%	0.23***
	1 - 2 years	10.35%		8.13%		6.67%		2.29%	
Degree Level	MA or Higher	4.55%	0.83*	3.92%	0.94	3.14%	1.01	2.47%	1.11
	BA or Lower	5.44%		4.17%		3.11%		2.24%	
Major/Minor in MTA	Major/Minor	4.62%	0.73***	3.83%	0.81	2.99%	0.85	2.29%	0.91
	No Major/Minor	6.19%		4.71%		3.50%		2.52%	
Best Qualified in MTA	Best Qualified	4.47%	0.57***	3.73%	0.65**	2.88%	0.67**	2.20%	0.71*
	Not Best Qualified	7.64%		5.60%		4.27%		3.06%	
Teaching Breaks	Two or More	5.09%	0.99	2.82%	0.66	3.72%	1.24	4.14%	2.06***
	Only One	4.75%	0.92	4.11%	0.98	3.17%	1.05	2.46%	1.21
	No Breaks	5.12%		4.21%		3.02%		2.05%	

Note. Data from the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]See Glossary for more information about teacher characteristic variables.

[b]The dependent variables were coded as follows: voluntary movers=1 vs stayers=0; voluntary leavers=1 vs stayers=0; involuntary movers=1 vs stayers=0; involuntary leavers=1 vs stayers=0. The predictor variables were all treated as indicator variables with the lower level listed as the reference category coded as "0." The other (comparision) levels were coded as "1."

[c]Ratio of the odds (OR) of being a mover (vs a stayer) and a leaver (vs a stayer), respectively (*p< .05, **p< .01, ***p< .001). See Glossary for a description of odds ratios.

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Table 6. *Teacher Working Condition and Career Judgment Variables Predictive of Public School Attrition of Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Teacher Variables[a]		Movers and Leavers Percentages[b] and Odds Ratios[c]							
		Voluntary Movers		Voluntary Leavers		Involuntary Movers		Involuntary Leavers	
Name	Levels[b]	Percent	OR	Percent	OR	Percent	OR	Percent	OR
Teacher Working Conditions									
Employment Status	Regular Full-Time	4.92%	0.78	3.67%	0.44***	2.59%	0.29***	2.36%	1.04
	Irregular Part-Time	6.19%		8.05%		8.54%		2.27%	
Salary (Quintiles)	$34,353 - $84,000	2.81%	0.32***	2.63%	0.35***	2.47%	0.45***	3.66%	2.00**
	$27,500 - $34,347	3.46%	0.40***	2.98%	0.40***	2.75%	0.50***	2.05%	1.10
	$23,000 - $27,479	6.24%	0.74*	5.03%	0.68**	3.45%	0.63**	1.79%	0.96
	$19,100 - $22,995	8.26%	1.01	5.37%	0.73*	3.22%	0.59**	1.17%	0.63
	$0 - $19,097	8.21%		7.20%		5.38%		1.86%	
Minority Enrollment	> 20% Minority	6.22%	1.54***	4.12%	1.03	3.30%	1.11	2.35%	1.00
	< 20% Minority	4.13%		4.01%		2.99%		2.35%	
Teacher Control	High Control	4.88%	0.72*	3.94%	0.73	3.03%	0.73*	2.24%	0.62***
	Low/Mod Control	6.66%		5.31%		4.11%		3.58%	
Teacher Influence	High Influence	4.53%	0.79**	3.66%	0.79*	3.01%	0.92	2.01%	0.71**
	Low/Mod Influence	5.69%		4.58%		3.27%		2.80%	
Split Assignment	> One Field	5.85%	1.23*	4.05%	1.00	3.00%	0.95	2.32%	0.98
	Only One Field	4.79%		4.06%		3.16%		2.36%	
Extra Hours (Student)	7 + Extra Hours	4.93%	0.98	3.65%	0.88	2.65%	0.82	1.61%	0.65*
	< 7 Extra Hours	5.04%		4.13%		3.20%		2.48%	
Enforce Rules (Principal)	Doesn't Enforce	7.44%	1.67***	5.55%	1.49**	3.36%	1.09	2.79%	1.23
	Enforces	4.60%		3.79%		3.08%		2.27%	
Administrative Support[d]	Strongly Agree	3.77%	0.36***	3.99%	0.69	2.73%	0.63*	1.85%	0.67*
	Agree/Disagree	5.97%	0.58***	4.80%	0.84	3.02%	0.70	2.57%	0.93
	Strongly Disagree	9.92%		5.68%		4.25%		2.75%	
Teacher Career Judgments									
Become Teacher	Become Again	5.84%	0.77**	3.23%	0.58***	3.12%	1.00	2.20%	0.84
	Not Become Again	4.55%		5.47%		3.12%		2.62%	
Stay School (next year)	Stay at School	2.80%	0.07***	2.27%	0.07***	1.87%	0.08***	1.03%	0.04***
	Leave School	30.19%		25.49%		19.34%		19.35%	
Continue Teaching (next year)	Continue Teaching	4.83%	0.40***	3.55%	0.16***	3.11%	0.89	2.13%	0.21***
	Leave Teaching	11.33%		18.53%		3.48%		9.47%	

Note. Data from the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]See Glossary for more information about teacher working condition and career judgment variables.

[b]The dependent variables were coded as follows: voluntary movers=1 vs stayers=0; voluntary leavers=1 vs stayers=0; involuntary movers=1 vs stayers=0; involuntary leavers=1 vs stayers=0. The predictor variables were all treated as indicator variables with the lower level listed as the reference category coded as "0." The other (comparision) levels were coded as "1."

[c]Ratio of the odds (OR) of being a mover (vs a stayer) and a leaver (vs a stayer), respectively (*p< .05, **p< .01, ***p< .001). See Glossary for a description of odds ratios.

[d]Based on SASS/TFS waves 1 and 3 combined.

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Table 7. *Teacher Follow-Up Variables Predictive of Public School Attrition of Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Teacher Follow-Up Variables[a]		Movers and Leavers Percentages[b] and Odds Ratios[c]							
		Voluntary Movers		Voluntary Leavers		Involuntary Movers		Involuntary Leavers	
Name	Levels[b]	Percent	OR	Percent	OR	Percent	OR	Percent	OR
Status Variables (TFS)									
Degree Enrollment	Enrolled	7.04%	1.53***	5.92%	1.60***	4.10%	1.39**	0.57%	0.21***
	Not Enrolled	4.73%		3.78%		2.98%		2.60%	
Extra Pay	Receive	4.35%	0.77***	-----[d]		2.70%	0.77*	-----[d]	
	Don't Receive	5.58%				3.47%			
Stay School (next year)	Stay at School	4.80%	0.61***	-----[d]		2.81%	0.40***	-----[d]	
	Leave School	7.65%				6.69%			
Change Variables (SASS to TFS)									
Marital Status Change	Became Married	11.27%	2.49***	10.28%	2.87***	3.11%	1.00	1.49%	0.62
	Became Unmarried	4.94%	1.02	6.22%	1.66	3.58%	1.15	1.38%	0.57*
	No Change	4.86%		3.84%		3.11%		2.39%	
Dependents Change	TFS Year Only	6.34%	1.13	15.17%	4.98***	2.35%	0.71	2.67%	0.62
	SASS Year Only	4.55%	0.79**	3.73%	1.08	3.08%	0.94	1.11%	0.25***
	No Dependents	5.67%		3.47%		3.27%		4.27%	
Earned Recent Degree	Yes	9.64%	2.08***	8.76%	2.36***	4.14%	1.35	0.90%	0.37
	No	4.89%		3.91%		3.09%		2.39%	
Certification Change	Partly to Fully	7.06%	1.54**	-----[d]		3.92%	1.32	-----[d]	
	Fully to Partly	13.02%	3.04***	-----[d]		6.41%	2.22**	-----[d]	
	No Change	4.70%				3.00%			
Employment Change	Part- to Full-Time	6.78%	1.41*	6.62%	1.75**	8.92%	3.47***	0.47%	0.19***
	All Other Status	4.92%		3.89%		2.75%		2.46%	
Salary Change	Increase	4.69%	1.17	-----[d]		3.03%	1.06	-----[d]	
	Decrease	7.04%	1.80***	-----[d]		3.71%	1.32	-----[d]	
	No Change	4.04%				2.85%			
Income Change	Increase	5.97%	1.62***	3.40%	1.18	3.36%	1.32*	1.40%	0.94
	Decrease	6.34%	1.73***	8.00%	2.90***	4.05%	1.60***	6.13%	4.30***
	No Change	3.77%		2.91%		2.57%		1.50%	

Note. Data from the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]See Glossary for more information about teacher follow-up variables.

[b]The dependent variables were coded as follows: voluntary movers=1 vs stayers=0; voluntary leavers=1 vs stayers=0; involuntary movers=1 vs stayers=0; involuntary leavers=1 vs stayers=0. The predictor variables were all treated as indicator variables with the lower level listed as the reference category coded as "0." The other (comparision) levels were coded as "1."

[c]Ratio of the odds (OR) of being a mover (vs a stayer) and a leaver (vs a stayer), respectively (*p< .05, **p< .01, ***p< .001). See Glossary for a description of odds ratios.

[d]Predictor variable data not collected from former teachers (i.e., leavers).

Table 8. *Predicting Public School Attrition of Teachers Nationally: Full Logistic Regression Models for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Predictor Variable[b]		Type of School Attrition			
		Voluntary Movers[a]	Voluntary Leavers[a]	Involuntary Movers[a]	Involuntary Leavers[a]
Name	Level[a]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]
Situational Variables					
Teaching Field	General Elementary		0.79		
	General Secondary		0.97		
	Other Education		0.63*		
	Special Education				
Region	West	2.48***		0.78	
	South	2.76***		0.66**	
	Midwest	1.85***		0.71*	
	Northeast				
Teacher Characteristic Variables					
Age	52 - 89 years	0.13***	0.22***		8.29***
	43 - 51 years	0.22***	0.21***		1.06
	37 - 42 years	0.31***	0.34***		1.67
	29 - 36 years	0.42***	0.57***		1.09
	21 - 28 years				
Marital Status	Married Now				1.78**
	Previously Married				1.03
	Never Married				
Best Qualified in MTA	Best Qualified	0.64***			
	Not Best Qualified				
Breaks in Service	2 or more breaks	1.71**			
	1 break	1.41*			
	No breaks				
Teaching Experience	23- 53 years			0.29***	0.88
	14- 22 years			0.38***	0.27**
	7- 13 years			0.58***	0.27**
	3- 6 years			0.60**	0.20***
	1- 2 years				
Teacher Working Conditions					
Principal Enforces Rules	Doesn't Enforce	1.82***			
	Enforces				
Employment Status	Regular Full-Time		0.36***	0.33***	0.39**
	Irregular/Part-Time				

Table 8 (Continued). *Predicting Public School Attrition of Teachers Nationally: Full Logistic Regression Models for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Predictor Variable[b]		Type of School Attrition			
		Voluntary Movers[a]	Voluntary Leavers[a]	Involuntary Movers[a]	Involuntary Leavers[a]
Name	Level[a]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]
Teacher Follow-Up Change Variables From SASS to TFS Year					
Marital Status Change	Become Married				1.30
	Become Unmarried				0.41**
	No Change				
Dependents Change	TFS Year Only		4.51***	0.58*	0.76
	SASS Year Only		1.33**	0.94	0.45***
	No Change				
Earned Recent Degree	Yes	1.79**	1.92*		
	No				
Certification Change	Partly to Fully	1.13		1.02	
	Fully to Partly	2.73***		1.72*	
	No Change				
Employment Change	Part- to Full-Time		0.63		0.10***
	All Other Status				
Salary Change	Decrease	1.79***	----[f]		----[f]
	Increase	1.15	----[f]		----[f]
	No Change				
Income Change	Increase	1.46***	0.99	1.18	1.19
	Decrease	1.57***	2.67***	1.46**	3.72***
	No Change				
Concordance Index (c)[d]		0.721	0.736	0.664	0.875
GOF Test (χ^2)[e]		p>.20	p>.20	p>.20	p>.20

Note: Data from the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, NCES.

[a]The dependent variables were coded as follows: voluntary movers=1 vs stayers=0; voluntary leavers=1 vs stayers=0; involuntary movers=1 vs stayers=0; involuntary leavers=1 vs stayers=0. The predictor variables were all treated as indicator variables with the lower level listed as the reference category coded as "0." The other (comparision) levels were coded as "1."

[b]See Glossary for more information about predictor variables.

[c]Ratio of the odds of being a mover (vs a stayer), and a leaver (vs a stayer), respectively (*p< .05, **p< .01, ***p< .001). The SAS formula for converting an odds ratio to its Beta weight is LOG(OR). See Glossary for a description of odds ratios.

[d]The concordance index (c) estimates the probability that the model correctly orders a randomly selected pair of teachers (e.g., one voluntarily moving, the other staying). It is equal to the area under a receiver operating characteristics curve (ROC), defined on the basis of model estimated predicted probabilities, and is arithmetically equivalent to one-half Summer's D rank correlation index plus 0.5.

[e]Hosmer-Lemeshow Goodness-of-Fit Test.

[f]Predictor variable data not collected from former teachers (i.e., leavers).

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Table 9. *Predicting Public School Attrition of Teachers Nationally: Reduced Logistic Regression Models for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Predictor Variable[b]		Type of School Attrition			
		Voluntary Movers[a]	Voluntary Leavers[a]	Involuntary Movers[a]	Involuntary Leavers[a]
Name	Level[a]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]
Situational Variables					
Region	West	2.63***			
	South	2.89***			
	Midwest	1.92***			
	Northeast				
Teacher Characteristic Variables					
Age	52 - 89 years	0.13***	0.22***		9.05***
	43 - 51 years	0.23***	0.21***		1.12
	37 - 42 years	0.32***	0.34***		1.82
	29 - 36 years	0.44***	0.56***		1.10
	21 - 28 years				
Marital Status	Married Now				1.77**
	Previously Married				1.03
	Never Married				
Breaks in Service	2 or more breaks	1.73**			
	1 break	1.42**			
	No breaks				
Teaching Experience	23- 53 years			0.30***	0.79
	14- 22 years			0.38***	0.24**
	7- 13 years			0.59***	0.25**
	3- 6 years			0.60**	0.21***
	1- 2 years				
Teacher Working Conditions					
Principal Enforces Rules	Doesn't Enforce	1.82***			
	Enforces				
Employment Status	Regular Full-Time		0.46***	0.31***	
	Irregular/Part-Time				

Table 9 (Continued). *Predicting Public School Attrition of Teachers Nationally: Reduced Logistic Regression Models for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Predictor Variable[b]		Type of School Attrition			
		Voluntary Movers[a]	Voluntary Leavers[a]	Involuntary Movers[a]	Involuntary Leavers[a]
Name	Level[a]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]
Teacher Follow-Up Change Variables From SASS to TFS Year					
Dependents Change	TFS Year Only		4.51***	0.58*	0.83
	SASS Year Only		1.34**	0.93	0.46***
	No Change				
Earned Recent Degree	Yes	1.77**	1.90*		
	No				
Certification Change	Partly to Fully	1.21	-----[f]	1.04	-----[f]
	Fully to Partly	2.84***	-----[f]	1.78*	-----[f]
	No Change				
Employment Change	Part- to Full-Time				0.25***
	All Other Status				
Income Change	Increase	1.43***	0.98		1.20
	Decrease	1.64***	2.67***		3.76***
	No Change				
Concordance Index (c)[d]		0.713	0.734	0.659	0.871
GOF Test (χ^2)[e]		$p>.20$	$p>.20$	$p>.20$	$p>.20$

Note. Data from the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]The dependent variables were coded as follows: voluntary movers=1 vs stayers=0; voluntary leavers=1 vs stayers=0; involuntary movers=1 vs stayers=0; involuntary leavers=1 vs stayers=0. The predictor variables were all treated as indicator variables with the lower level listed as the reference category coded as "0." The other (comparision) levels were coded as "1."

[b]See Glossary for more information about predictor variables.

[c]Ratio of the odds of being a mover (vs a stayer), and a leaver (vs a stayer), respectively (*$p<.05$, **$p<.01$; ***$p<.001$). The SAS formula for converting an odds ratio to its Beta weight is LOG(OR). See Glossary for a description of odds ratios.

[d]The concordance index (c) estimates the probability that the model correctly orders a randomly selected pair of teachers (e.g., one voluntarily moving, the other staying). It is equal to the area under a receiver operating characteristics curve (ROC), defined on the basis of model estimated predicted probabilities, and is arithmetically equivalent to one-half Summer's D rank correlation index plus 0.5.

[e]Hosmer-Lemeshow Goodness-of-Fit Test.

[f]Predictor variable data not collected from former teachers (i.e., leavers).

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Table 10. *Including Teacher Career Judgments in the Prediction of Public School Attrition of Teachers Nationally: Reduced Logistic Regression Models for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Predictor Variable[b]		Type of School Attrition			
		Voluntary Movers[a]	Voluntary Leavers[a]	Involuntary Movers[a]	Involuntary Leavers[a]
Name	Level[a]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]
Situational Variables					
Region	West	2.01***		0.63*	
	South	2.72***		0.57***	
	Midwest	1.65**		0.62**	
	Northeast				
Teacher Characteristic Variables					
Age	52 - 89 years	0.18***	0.25***		9.05***
	43 - 51 years	0.29***	0.25***		1.12
	37 - 42 years	0.42***	0.41***		1.82
	29 - 36 years	0.46***	0.58**		1.10
	21 - 28 years				
Marital Status	Married Now				1.77**
	Previously Married				1.03
	Never Married				
Breaks in Service	2 or more breaks	1.54*			
	1 break	1.33			
	No breaks				
Teaching Experience	23- 53 years			0.33***	0.79
	14- 22 years			0.41***	0.24**
	7- 13 years			0.56***	0.25**
	3- 6 years			0.53**	0.21***
	1- 2 years				
Best Qualified in MTA	Best Qualified				
	Not Best Qualified	0.70**			
Teacher Working Conditions					
Principal Enforces Rules	Doesn't Enforce				
	Enforces				
Employment Status	Regular Full-Time		0.55**		
	Irregular/Part-Time				
Career Judgment Variables					
Stay School (next year)	Stay at School	0.08***	0.09***	0.08***	
	Leave School				
Continue Teaching (next year)	Continue Teaching		0.39***		
	Leave Teaching				

Table 10 (Continued). *Including Teacher Career Judgments in the Prediction of Public School Attrition of Teachers Nationally: Reduced Logistic Regression Models for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Predictor Variable[b]		Type of School Attrition			
		Voluntary Movers[a]	Voluntary Leavers[a]	Involuntary Movers[a]	Involuntary Leavers[a]
Name	Level[a]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]
Teacher Follow-Up Change Variables From SASS to TFS Year					
Dependents Change	TFS Year Only		5.21***		0.83
	SASS Year Only		1.60***		0.46***
	No Change				
Earned Recent Degree	Yes	1.61*	1.99*		
	No				
Certification Change	Partly to Fully	1.17	-----[f]	1.09	-----[f]
	Fully to Partly	2.41***	-----[f]	1.81*	-----[f]
	No Change				
Employment Change	Part- to Full-Time		0.54*		0.25***
	All Other Status				
Income Change	Increase	1.49**	1.05	1.25	1.20
	Decrease	1.67***	2.70***	1.69**	3.76***
	No Change				
Concordance Index (c)[d]		0.808	0.814	0.766	0.871
GOF Test (χ^2)[e]		p>.20	p>.20	p>.20	p>.20

Note. Data from the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]The dependent variables were coded as follows: voluntary movers=1 vs stayers=0; voluntary leavers=1 vs stayers=0; involuntary movers=1 vs stayers=0; involuntary leavers=1 vs stayers=0. The predictor variables were all treated as indicator variables with the lower level listed as the reference category coded as "0." The other (comparision) levels were coded as "1."

[b]See Glossary for more information about predictor variables.

[c]Ratio of the odds of being a mover (vs a stayer), and a leaver (vs a stayer), respectively (*p< .05, **p< .01, ***p< .001). The SAS formula for converting an odds ratio to its Beta weight is LOG(OR). See Glossary for a description of odds ratios.

[d]The concordance index (c) estimates the probability that the model correctly orders a randomly selected pair of teachers (e.g., one voluntarily moving, the other staying). It is equal to the area under a receiver operating characteristics curve (ROC), defined on the basis of model estimated predicted probabilities, and is arithmetically equivalent to one-half Summer's D rank correlation index plus 0.5.

[e]Hosmer-Lemeshow Goodness-of-Fit Test.

[f]Predictor variable data not collected from former teachers (i.e., leavers).

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Table 11. *Including Administrative Support Perceptions in the Prediction of Public School Attrition of Teachers Nationally: Reduced Logistic Regression Models for Two School Years Combined (1988-89 and 1994-95)*

Predictor Variable[b]		Type of School Attrition			
		Voluntary Movers[a]	Voluntary Leavers[a]	Involuntary Movers[a]	Involuntary Leavers[a]
Name	Level[a]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]
Situational Variables					
Region	West	2.54***			
	South	2.73***			
	Midwest	1.81**			
	Northeast				
Teacher Characteristic Variables					
Age	52 - 89 years	0.16***	0.21***		12.76***
	43 - 51 years	0.27***	0.20***		1.09
	37 - 42 years	0.38***	0.35***		1.65
	29 - 36 years	0.44***	0.52***		0.92
	21 - 28 years				
Marital Status	Married Now				
	Previously Married				
	Never Married				
Breaks in Service	2 or more breaks				
	1 break				
	No breaks				
Teaching Experience	23- 53 years			0.30***	
	14- 22 years			0.34***	
	7- 13 years			0.53***	
	3- 6 years			0.58**	
	1- 2 years				
Teacher Working Conditions					
Principal Enforces Rules	Doesn't Enforce				
	Enforces				
Administrative Support	Strongly Agree	0.29***	0.55**	0.58*	
	Agree/Disagree	0.52***	0.70	0.66	
	Strongly Disagree				
Employment Status	Regular Full-Time		0.40***	0.32***	
	Irregular/Part-Time				

Table 11 (Continued). *Including Administrative Support Perceptions in the Prediction of Public School Attrition of Teachers Nationally: Reduced Logistic Regression Models for Two School Years Combined (1988-89 and 1994-95)*

Predictor Variable[b]		Type of School Attrition			
		Voluntary Movers[a]	Voluntary Leavers[a]	Involuntary Movers[a]	Involuntary Leavers[a]
Name	Level[a]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]
Teacher Follow-Up Change Variables From SASS to TFS Year					
Dependents Change	TFS Year Only		4.35***	0.59	1.06
	SASS Year Only		1.41**	0.96	0.49***
	No Change				
Earned Recent Degree	Yes	1.71*	2.27*		
	No				
Certification Change	Partly to Fully	1.11	-----[f]		-----[f]
	Fully to Partly	2.61***	-----[f]		-----[f]
	No Change				
Employment Change	Part- to Full-Time				0.34***
	All Other Status				
Income Change	Increase	1.56***	0.91		1.42
	Decrease	1.88***	2.80***		4.35***
	No Change				
Concordance Index (c)[d]		0.711	0.739	0.652	0.843
GOF Test (χ^2)[e]		$p>.20$	$p>.05$	$p>.20$	$p>.20$

Note. Data from the 1988-89 and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]The dependent variables were coded as follows: voluntary movers=1 vs stayers=0; voluntary leavers=1 vs stayers=0; involuntary movers=1 vs stayers=0; involuntary leavers=1 vs stayers=0. The predictor variables were all treated as indicator variables with the lower level listed as the reference category coded as "0." The other (comparision) levels were coded as "1."

[b]See Glossary for more information about predictor variables.

[c]Ratio of the odds of being a mover (vs a stayer), and a leaver (vs a stayer), respectively (*$p<.05$, **$p<.01$, ***$p<.001$). The SAS formula for converting an odds ratio to its Beta weight is LOG(OR). See Glossary for a description of odds ratios.

[d]The concordance index (c) estimates the probability that the model correctly orders a randomly selected pair of teachers (e.g., one voluntarily moving, the other staying). It is equal to the area under a receiver operating characteristics curve (ROC), defined on the basis of model estimated predicted probabilities, and is arithmetically equivalent to one-half Summer's D rank correlation index plus 0.5.

[e]Hosmer-Lemeshow Goodness-of-Fit Test.

[f]Predictor variable data not collected from former teachers (i.e., leavers).

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Table 12. *Full Logistic Regression Models Contrasting Four School Attrition Components of Public School Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Predictor Variable[b]		Type of School Attrition			
		Voluntary Movers vs Involuntary Movers[a]	Voluntary Leavers vs Involuntary Leavers[a]	Voluntary Leavers vs Voluntary Movers[a]	Involuntary Leavers vs Involuntary Movers[a]
Name	Level[a]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]
Situational Variables					
Teaching Level	Secondary				0.55**
	Elementary				
Teaching Field	General Elementary		1.18		
	General Secondary		1.14		
	Other Education		1.61		
	Special Education				
Community Type	Central City				1.72
	Rural/Small Town				1.26
	Suburban				
Region	West	0.33***		2.18**	
	South	0.24***		1.85*	
	Midwest	0.37***		1.43	
	Northeast				
Teacher Characteristic Variables					
Age	52 - 89 years	2.64*	36.02***		0.08***
	43 - 51 years	2.23***	5.63 **		0.97
	37 - 42 years	2.08***	3.88*		0.72
	29 - 36 years	2.27***	1.26		1.01
	21 - 28 years				
Teaching Experience	23- 53 years	0.90	0.85	0.63	0.29*
	14- 22 years	0.73	0.27**	1.00	1.13
	7- 13 years	0.71	0.29*	0.94	1.61
	3- 6 years	0.52**	0.26**	1.22	2.44
	1- 2 years				
Degree Level	MA or Higher				1.96*
	BA or Lower				
Best Qualified in MTA	Best Qualified				
	Not Best Qualified				
Prior Activity	Non-Education				1.50
	Non-Teacher in Ed				1.09
	Teacher				1.79*
	Not Working				
Teaching Breaks	Two or More		1.21	1.84*	
	Only One		0.60*	1.08	
	No Breaks				
Teacher Working Conditions					
Employment Status	Regular Full-Time	0.43***		1.89***	
	Irregular Part-Time				

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Table 12 (Continued). *Full Logistic Regression Models Contrasting Four School Attrition Components of Public School Teachers Nationally for Three School Years Combined (1988-89, 1991-92, and 1994-95)*

Predictor Variable[b]		Type of School Attrition			
		Voluntary Movers vs Involuntary Movers[a]	Voluntary Leavers vs Involuntary Leavers[a]	Voluntary Leavers vs Voluntary Movers[a]	Involuntary Leavers vs Involuntary Movers[a]
Name	Level[a]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]	Odds Ratio[c]
Teacher Follow-Up Change Variables From SASS to TFS Year					
Marital Status Change	Become Married	0.46	0.66		0.63
	Become Unmarried	1.16	0.33*		2.77
	No Change				
Dependents Change	TFS Year Only		0.34***	0.20***	
	SASS Year Only		0.68	0.69*	
	No Change				
Enrolled in Degree Program	Enrolled		0.41**		2.06
	Not Enrolled				
Earned Recent Degree	Yes	0.62*	0.40		
	No				
Employment Change	Part- to Full-Time		0.10**		7.11***
	All Other Status				
Income Change	Increase			1.40*	0.86
	Decrease			0.53***	0.41**
	No Change				
Concordance Index (c)[d]		0.699	0.905	0.679	0.905
GOF Test (χ^2)[e]		$p>.10$	$p<.01$	$p<.01$	$p<.01$

Note. Data from the 1988-89, 1991-92, and 1994-95 Teacher Follow-Up Surveys, National Center for Education Statistics, USDE.

[a]The dependent variables were coded as follows: voluntary movers=1 vs involuntary movers=0; voluntary leavers=1 vs involuntary leavers=0; voluntary leavers=1 vs voluntary movers=0; involuntary leavers=1 vs involuntary movers=0. The predictor variables were all treated as indicator variables with the lower level listed as the reference category coded as "0." The other (comparision) levels were coded as "1."

[b]See Glossary for more information about predictor variables.

[c]Ratio of the odds of being a (1) vs a 0 (*$p<.05$, **$p<.01$, ***$p<.001$). The SAS formula for converting an odds ratio to its Beta weight is LOG(OR). See Glossary for a description of odds ratios.

[d]The concordance index (c) estimates the probability that the model correctly orders a randomly selected pair of teachers (e.g., one voluntarily moving, the other involuntarily moving). It is equal to the area under a receiver operating characteristics curve (ROC), defined on the basis of model estimated predicted probabilities, and is arithmetically equivalent to one-half Summer's D rank correlation index plus 0.5.

[e]Hosmer-Lemeshow Goodness-of-Fit Test.

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APPENDIX A: DATA ANALYSIS METHODS

Data Sources

Public School Teacher Questionnaire: Schools and Staffing Surveys

One source of data was teachers' self reports to the Public School Teacher Questionnaires (PSTQ) of the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey (SASS), conducted by the National Center for Education Statistics (NCES), U.S. Department of Education. Information from the PSTQs was used in these analyses to specify the characteristics and working conditions of employed teachers during the base year prior to turnover. Such teachers were analyzed as a function of various types of school attrition.

The PSTQ data were obtained from three large national-probability samples of K - 12 public school teachers (N = 40,522 teachers in early 1988, N = 46,599 teachers in early 1991, and N = 46,944 in early 1994) with high weighted response rates (86% in 1988, 91% in 1991, and 88% in 1994). Therefore, this database provides nationally representative estimates of the number of public school teachers in each of the three survey years. Furthermore, there are no missing data for completed PSTQs because NCES has imputed values for item nonresponse. More detailed information about SASS is found in an overview published by NCES (1996), and in technical descriptions published by NCES (e.g., see Choy, Medrich, Henke, & Bobbitt, 1992, Appendix A for the 1987-88 SASS; Choy, Henke, Alt, Medrich, & Bobbitt, 1993, Appendix C, for the 1990-91 SASS; and Henke, Choy, Geis, & Broughman, 1996, Appendix C, for the 1993-94 SASS).

Teacher Follow-up Surveys: Schools and Staffing Surveys

The second source of data was teachers' self reports to the Teacher Follow-up Survey (TFS) that was conducted by NCES in each of the years following SASS (i.e., 1988-89, 1991-92, and 1994-95) as a longitudinal component of SASS. Information from the TFSs was used in these analyses to identify school attrition of employed teachers from one year (the SASS year) to the next year (the TFS year). Such teachers were analyzed as a function of four types of school attrition: (a) voluntarily transferring or moving from one school to another, (b) voluntarily leaving or exiting teaching, (c) involuntarily transferring or moving from one school to another, and (d) voluntarily leaving or exiting teaching.

The TFS data were obtained from three national-probability samples of K - 12 public school teachers (N = 3,248 teachers in early 1989, N = 3,284 teachers in early 1992, and N = 2,779 in early 1995) with high weighted response rates (for current teachers, 98% in 1989, 97% in 1992, and 92% in 1995; for former teachers or exited teachers, 94% in 1989, 92% in 1992, and 89% in 1995). Therefore, this database provides nationally representative estimates of the number of public school teachers in each of the three survey years, including the four types of school attrition (voluntary movers, voluntary leavers, involuntary movers, and involuntary leavers). Furthermore, there are no missing data for completed TFS questionnaires because NCES has imputed values for item nonresponse. More detailed information about the TFS is found in an overview published by NCES (1996), and in technical descriptions published by NCES (see Bobbitt, Faupel, & Burnes, 1991, pp. 23-29 for the 1988-89 TFS; Bobbitt, Leich, Whitener, & Lynch, 1994, pp. 19-, for the 1991-92 TFS; and Whitener, et al., 1997, pp. 19-46, for the 1994-95 TFS).

Sources of the Community Type Variable

The community type variable was scaled by seven levels (large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural). For the 1987-88 SASS, a community type code for each public school teacher was based upon the postal ZIP code of school in which the teacher was employed, and matched to the U.S. Census community size for that ZIP code. For the 1990-91 and 1993-94 SASSs, each public school teacher was given a community type code by matching the postal ZIP code of the school in which the teacher was employed to the LOCALE code on the NCES's Common Core of Data School File.

Teacher Sample

In keeping with the SASS definition based on teacher self reports to PSTQs, a teacher was any individual employed either full-time or part-time at a public school who reported his/her main assignment as teaching in any grade(s) K - 12, including itinerant teachers and long-term substitutes. Excluded from this definition of a teacher were respondents who identified their main assignment as pre-kindergarten teacher, short-term substitute, student teacher, teacher aide, or a non-teaching specialist of any kind.

The sizes of the samples of teachers used in the various analyses are presented in the several tables of results.

Procedures

Descriptive Trends in School Attrition: Tables 1 - 3

Based on the sample sizes reported in the Tables 1 through 3 for the various types of teacher turnover, weighted national estimates, as well as their percentages, of the numbers of teachers were computed by special procedures developed by NCES for complex sample survey data (Kaufman & Huang, 1993). These national estimates were used in the statistical analyses testing for associations among variables. Because SASS data are subject to design effects due to stratification and clustering of the sample, standard errors for the national estimates were computed using replicate weights generated by the method of balanced repeated replications with the statistical software "WesVarPC".

Logistic Regression of School Attrition: Tables 4 - 12

Logistic regression analyses of four major dimensions of the attrition of teachers from public schools (i.e., dependent variables) were performed in sequence by the series of procedures described below. The dichotomous dependent variables analyzed were: (a) voluntary movers versus stayers (coded 1 vs. 0), (b) voluntary leavers versus stayers (coded 1 vs. 0), (c) involuntary movers versus stayers (coded 1 vs. 0), and (d) involuntary leavers versus stayers (coded 1 vs. 0), all as shown in Figure 1.

Prior to the analyses of the four major dimensions of school attrition described above, it was determined that these four dimensions were sufficiently different from each other to justify the four separate analyses as contrasted with simply combining all types of school attrition into one analysis. Accordingly, the four major dimensions of school attrition were compared with each other through logistic regression analyses as follows: involuntary movers versus voluntary movers (coded 1 vs. 0), involuntary leavers versus voluntary leavers (coded 1 vs. 0), voluntary movers versus voluntary leavers (coded 1 vs. 0), and involuntary movers versus involuntary leavers (coded 1 vs. 0), all as shown in Figure 2.

These analyses were based on data for the three SASS/TFS waves (1987-89, 1990-92, 1993-95) combined. This analytic strategy provided sufficient sample size to include various predictor variables into multivariate models that otherwise would not have been possible. To test whether there were differences in attrition as a function of SASS/TFS wave, this variable was incorporated as one of five "situational variables" in the regression analyses. As shown in Table 8 for the full regression models for the four dimensions of school attrition, SASS/TFS wave was not a statistically significant predictor for any of the four dimensions. This finding

provides support for combining data from the three SASS/TFS waves for the various analyses described in this section.

The logistic regression procedures are described in the following paragraphs.

1. A comprehensive set of potential independent (i.e., predictor) variables was identified that might be associated with one or more of the four school attrition variables and that were available for all three administrations of SASS/TFS (1987-89, 1990-92, and 1993-95). The one exception was the administrative support variable that was available only for 1987-89 and 1993-95. Since TFS was composed of two questionnaires (the Questionnaire for Current Teachers and the Questionnaire for Former Teachers), information that was exclusive to the latter questionnaire was not used for analyzing voluntary leavers because the same information was not available for its comparison group (stayers). However, information that was available only for continuing teachers (stayers and movers), but not for leavers, was used in analyses of voluntary and involuntary movers versus stayers because the same information was available for these three groups since they all completed the Questionnaire for Current Teachers.
2. These potential predictor variables were classified into five categories: (a) situational, (b) teacher characteristics, (c) working conditions, (d) follow-up variables, and (e) career judgments. These categories were termed "stages" because they were subsequently analyzed by category in stages as described in the following paragraphs. The predictor variables (and their coding) are listed in Table A-1 and defined connotatively in Appendix B (Glossary). Even though variables classified here as "teacher career judgments" were intentionally excluded in a prior effort by NCES to model teacher attrition because they could "easily obscure the effects of other more policy-relevant variables" (Arnold, Choy, & Bobbitt, 1993, p. 45), we included them as the final stage. Thus, it was possible to determine to what extent teacher judgment variables might obscure the effects of policy-relevant predictor variables because the staged analyses would show the effects both with and without the inclusion of such variables. Operational definitions of all variables analyzed in this research are available upon request from the senior author.
3. Potential predictor variables listed in Table A-1 were subjected to the following analyses based on the three administrations of SASS/TFS (1987-89, 1990-92, and 1993-95) combined into one large dataset:
   a. Sample size: A few variables were defined by responses to the Public School Questionnaire of SASS. However, if a school did not respond to the school questionnaire, the school variable was missing for teachers from that school. Therefore, a few

Table A-1. *List of Potential Predictor Variables Classified by Stages Along with Coding of Variable Levels*

Stage I: Situational Variables (From SASS)

Teaching Level: secondary (code = 1) vs. elementary (code = 0)
Teaching Field:
- general elementary (1)
- general secondary (1)
- other education (1)
- special education (0)

Community Type (Trichotomous): central city (1), vs. rural/small town (1), vs. suburban (0)
Region (Four Levels): West (1), vs. South (1), vs. Midwest (1), vs. Northeast (0)
SASS/TFS Wave (Trichotomous): 1993-95 (1), vs. 1990-92 (1), vs 1987-89 (0)

Stage II: Teacher Characteristic Variables (From SASS)

Demographic Variables

Sex: female (1) vs. male (0)
Race/Ethnicity: White (excluding Hispanic) (1) vs Non-white (including Hispanic) (0)
Age (Quintiles)
Marital Status (Trichotomous): married (1), vs. previously married (1), vs. never married (0)
Child Age (Trichotomous): child under age 6 (1), vs child over age 5 (1), vs. no child (0)

Qualification variables

Certification: fully certified in main teaching assignment (1) vs. partly certified (0)
Teaching Experience (Quintiles)
Degree Level: masters or higher (1) vs. bachelors or lower (0)
Major/Minor in MTA: major/minor in main teaching assignment (1) vs no such major/minor (0)
Best Qualified: best qualified in MTA (1) vs. not best qualified in MTA (0)
Degree Age: number of years since earning most recent degree[a]

Career Path

Teaching Breaks (Trichotomous): two or more (1), vs. one (1), vs. no breaks in teaching employment (0)
Private School: did teach in private school (1) vs. never taught in private school (0)[b]
Prior Activity:[b]
- before teaching in this school, was working in non-educational position (1)
- working in education in non-teaching position (1)
- teaching (1)
- not working (0)

Note. See the Glossary for definitions of stages and predictor variables.

[a]Reduced sample size. [b]Low association with dependent variables.

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Table A-1 (Continued). *List of Potential Predictor Variables*

Stage III: Teacher Working Conditions (From SASS)

Employment Status: regular full-time (1) vs. irregular and/or part-time (0)
Salary (Quintiles)
Extra Pay: earned income during academic year in addition to base salary (1) vs. none (0)[b]
Minority enrollment: > = 20% minority enrollment (1) vs. < 20% minority enrollment (0)
Free Lunch: > = 20% students with free lunch eligibility (1) vs. <20% eligibility (0)[a]
Teacher Control: teachers report high classroom control (1) vs. moderate or low control (0)
Teacher Influence: teachers report high policy influence (1) vs. moderate or low influence (0)
Split Assignment: assigned to teach in more than one field (1) vs assigned to one field only (0)
Self-Contained Classroom: self-contained classroom (1) vs. all others (0)[b]
Extra Hours (Student): teacher spent > = 7 non-school hours/week with students (1) vs. < 7 hours/week (0)
Extra Hours (Other): teacher spent > = 7 non-school hours/week on other school-related activities (1) vs. < 7 hours/week (0)[b]
Average Class Size (Deciles) [a,b]
School Problems (See Glossary)
School Size (Deciles)[a,b]
Administrative Support: strongly agree (1), vs. somewhat agree or somewhat disagree (1), vs. strongly disagree (0)

Stage IV: Teacher Followup Variables

Followup Status Variables (From TFS)

Degree Enrollment: Enrolled in degree program (1) vs not enrolled (0)
Extra Pay: earned income during academic year in addition to base salary (1) vs. none (0)
Stay School (TFS): expect to teach in this school next year (1) vs. expect to leave school (0)

Followup Change Variables (Change from SASS to TFS)

Marital Change (Trichotomous): changed from unmarried to married (1), vs. all other marital change (1), vs no marital change (0)
Dependents Change (Trichotomous): dependent child reported in TFS year only (1), vs dependent child reported in SASS year only (1), vs. no such change (0)
Earned Recent Degree: earned degree during past year (1) vs. did not earn degree (0)
Certification Change (Trichotomous): changed from partly to fully certified (1), vs. changed from fully to partly certified (1), vs. no certification change (0)
Earned Promotion: earned promotion in education (1) vs. no promotion[c] (0)
Employment Change: changed from part to full-time employment (1) vs. other employment status (0)
Salary Change (Trichot.): increased salary (1), vs. decreased salary (1) , vs. no change (0)
Income Change (Trichot.): increased family income (1), vs. decreased income (1), vs. no change (0)

Stage V: Teacher Career Judgments (From SASS)

Become teacher: would become a teacher again (1) vs. would not become a teacher again (0)
Stay School (SASS): expect to teach in this school next year (1) vs. expect to leave school (0)
Continue Teaching: expect to continue teaching next year (1) vs. expect to leave teaching (0)

[a]Reduced sample size. [b]Low association with dependent variables. [c]Insufficient sample size.

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predictor variables were excluded from further use due to such missing data, as indicted by superscript "a" to the variables listed in Table A-1.

b. Association with dependent variables: The association of each predictor variable of Table A-1 with each of the four dependent school attrition variables was examined separately by means of a series of bivariate logistic regression analyses using SAS, a statistical software package. A few variables were excluded from further analyses due to low associations with all four school attrition variables. Low association was defined by the size of the odds ratio--typically with odds ratios less than 1.20 that were not statistically significant as computed by PROC LOGISTIC using the NORMWT option. Variables excluded for low association are designated by Superscript "b" in Table A-1. Thus, all predictor variables without a superscript "a" or "b", as listed in Table A-1, were used in one or more of the logistic regression analyses described below.

c. Variable scaling: Several different forms of a few predictor variables were analyzed by the procedures described above. For example, the age factor was categorized in deciles and quintiles, and then analyzed as indicator variables. The quintile version was selected for use because it consistently produced regression models that satisfied the Hosmer-Lemeshow goodness-of-fit (GOF) test and yielded results that were relatively simple to interpret, as shown in Table 8. Similar analyses were made of the salary variable. For both the age and salary quintile variables, the upper and lower limits of the quintile categories were based on the unweighted SASS sample instead of on the weighted nationally-estimated number of teachers for computational efficiency. In a second example of analyzing different forms of a predictor variable, the dichotomous "dependents change" variable was tried as a dichotomous and trichotomous variable in these initial bivariate analyses. The final form of any variable selected for use in further analyses was based on consideration of three factors: (a) the strength of associations with dependent variables, (b) consistency with satisfying the GOF test, and (c) simplicity. The form for each variable used in the main logistic regression analyses is listed in Table A-1. All such variables were analyzed as indicator variables.

d. Refined set of predictor variables used: The set of predictor variables selected (from step "b" above) in the form used (from step "c" above), and their bivariate associations (in terms of odds ratios) with each of the four school attrition dependent variables, are shown in Tables 4 through 7. See also step 9 below.

4. The possibility of interactions between pairs of predictor variables was not examined because it was possible to fit logistic regression models to the four main dimensions of school attrition that satisfied GOF test without interaction terms (e.g., see the full regression models shown in Table 8).
5. For each of the four school attrition variables separately, predictor variables that were significantly associated with an attrition variable (from step 3.b. above) were selected for inclusion in one of five independent logistic regression models (one model for each of the five predictor variable stages). Thus, five models were computed for each of the four school attrition variables separately to identify predictor variables that were significantly associated with an attrition variable as computed by PROC LOGISTIC using the FREQ = weightvar statement in SAS. The predictor variables thus identified as significant at the .05 level were used in the staged analyses described in step 6. below. Because SASS data are subject to design effects due to stratification and clustering of the sample, standard errors for the *beta* weights computed by SAS systematically underestimated their size. Therefore, the criterion for selection of predictor variables for inclusion in these analyses based on statistical significance computed by SAS was quite liberal (i.e., it tended to include variables of marginal statistical significance). This was acceptable, because we did not wish to exclude variables of potential importance at this beginning phase of the analyses.
6. For each of the four school attrition variables separately, the predictor variables that were significantly associated (as computed by SAS) with a school attrition variable in the multiple logistic regression models in step 5 above were retained for inclusion in five trimmed independent logistic regression models (one model for each of the five predictor variable stages). Five such trimmed models were computed for each of the four school attrition variables.
7. For each of the four school attrition variables separately, the predictor variables selected in each of the first four stages for inclusion in the separate trimmed logistic regression models (as identified in step 6 above) were used next to construct full logistic regression models (see Table 8). The predictor variables selected for the fifth stage (Teacher Career Judgments) were held back at this time because they might obscure the associations of more policy relevant variables, as described in paragraph 2 above.
8. Upon fitting a full logistic regression model to each of the four school attrition variables (see Table 8), the variables with the greatest predictive power (i.e., those with odds ratios greater than 1.49, or with odds ratios less than 0.68) were selected and used to

construct reduced logistic regression models. As many predictor variables as possible were eliminated to attain the most parsimonious model, while continuing to satisfy the GOF test and without appreciable loss in predictive power as determined by the size of the *c* index. These efforts were modestly successful for all four teacher attrition dependent variables analyzed, the results of which are shown in Table 9. For example, decreasing the 14 predictor variable parameters of the full model for voluntary leavers versus stayers to the 10 parameters of the reduced model resulted in no appreciable loss in predictive power--the *c* index of 0.736 for the full model was reduced by only 0.002 to .734 for the reduced model. Therefore, a more parsimonious model was achieved in the reduced model without appreciable loss of predicative power.

9. Because SASS data are subject to design effects due to stratification and clustering of the sample, standard errors for the *beta* weights computed by SAS systematically underestimated their size. Therefore, the standard errors for *beta* weights (a) of the bivariate logistic regressions (from which the odds ratios reported in Tables 4 through 7 were computed), and (b) of the full logistic regression models seen in Tables 8 and 12, and the reduced logistic regression models seen in Tables 9, 10, and 11, were computed by using replicate weights generated by the method of balanced repeated replications with the statistical software "WesVarPC". These standard errors were then used to compute the statistical significance of the odds ratios seen in Tables 4 through 11.
10. All logistic regression models included in this report were based on the number of nationally estimated teachers as computed from the SASS weights (rounded to the nearest whole number) for each teacher in the sample. This was accomplished by PROC LOGISTIC using the FREQ = weightvar statement in SAS. Use of the nationally-weighted number of teachers was necessary to compute accurate *beta* weights, *c* indices, and GOF tests. Because the logistic regression analyses were based on the nationally estimated number of teachers instead of on the SASS sample, it was necessary to divide the χ^2 computed by SAS for the GOF test by the average weight of teachers in the relevant SASS sample in order for the χ^2 test to be based on true effective sample sizes rather than on the estimated national population.

APPENDIX B: GLOSSARY[4]

Administrative Support (Trichotomous)

Administrative support (trichotomous) was defined as a three-category variable in which each teacher was classified according to her/his agreement with the following statement: "The school administration's behavior toward the staff is supportive and encouraging". The categories of agreement were: strongly agree, somewhat agree or somewhat disagree, versus strongly disagree.

Attrition of Teachers

See School Attrition.

Age (Quintiles)

The age of teachers in years was converted to ranked quintiles for the three SASS years combined (1987-88, 1990-91, and 1993-94). The upper and lower limits for each of the quintile categories for the three SASS years combined are shown in Tables 5 and 8.

Become Teacher

Become teacher was defined as a dichotomous variable during SASS years: teachers who most likely would become a teacher again if they could go back to their college days and start over, versus teachers who probably would not become teachers again under these circumstances.

Best Qualified

Best qualified was defined as a dichotomous variable during SASS years: teachers report of the main teaching assignment for which they are best qualified matches their actual main teaching assignment, versus does not match.

***c* Index**

See Concordance Index

Certification

Certification of teachers was defined as a dichotomous variable during SASS years: fully certified versus partly certified teachers. See Fully Certified Teachers.

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[4]Operational definitions of variables analyzed in this research are available upon request from the senior author.

Certification Change (Trichotomous)

Certification change (trichotomous) from a SASS to TFS year was defined as a three-category variable in which teachers were classified according to their certification status as follows: changed from partly to fully certified, changed from fully to partly certified, versus no change.

Child Age (Trichotomous)

Child age (trichotomous) was defined as a three-category variable during SASS years in which teachers were classified by the age of their youngest dependent child (if any) as follows: a dependent child under age six, a dependent child over age five, versus no dependent child.

Community Type (Trichotomous)

Community type (trichotomous) was defined as a three-category variable in which communities in which schools were located are scaled in terms of population density from low to high, as follows: (a) Rural/Small Town, (b) Suburban (including large towns, urban fringe of mid-size city, and urban fringe of large city), and (c) Central City (including mid-size city and large city). The locales included in the three categories are:

Rural: A place with fewer than 2,500 people or a place designated as rural by Census.

Small town: A town not within a metropolitan area and with a population less than 25,000 but greater than 2,500.

Large town: A town not inside a metropolitan area, with a population greater than or equal to 25,000.

Urban fringe of a mid-size city: Place with a metropolitan area of mid-size city and defined as urban.

Urban fringe of a large city: Place within a metropolitan area of a large city and defined as urban by Census (i.e., within same county).

Mid-size city: Central city of a standardized metropolitan area having a population less than 400,000 and a population density less than 6,000 people per square mile.

Large city: Central city of a standardized metropolitan area having a population greater than or equal to 400,000 or a population density greater than or equal to 6,000 people per square mile.

Concordance Index (*c*)

The *c* (for concordance) index is a measure of the strength of the association between one or more independent variables (i.e., predictor variables) and a dichotomous dependent variable such as frequently analyzed by logistic regression. The *c* index estimates the probability that such a regression model correctly orders a randomly selected pair of teachers (e.g., one randomly selected from level "0" of a dichotomous dependent

variable, such as continuing teachers; the other randomly selected from level "1" of a dichotomous dependent variable, such as voluntary leaving teachers). The *c* index ranges from a lower limit of 0.50 to an upper limit of 1.00. More specifically, for any such pair of teachers, the *c* index gives the probability that a correct judgment can be made, by using the *beta* weights of the logistic regression model, as to which one of the pair of teachers is of the level "0" type (e.g., continuing) and which one is of the level "1" type (e.g., voluntary leaving). If (c = 0.50), the probability of correctly assigning each of a pair of teachers by level is pure chance (i.e., the model has no predictive power); if (c = 0.75), the probability of correctly assigning each of the pair of teachers by level is 0.75 (i.e., the model provides substantial predictive power); if (c = 1.00), each of the pair of teachers will be correctly assigned by level (i.e., the model has perfect predictive power). The *c* index is equal to the area under a receiver operating characteristics curve (ROC), and is arithmetically equivalent to one-half Summer's D rank correlation index plus 0.5. More information about the *c* index can be found in Harrell, Lee, and Mark (1996, pp. 370-71).

Continue Teaching

Continue teaching was defined as a dichotomous variable during SASS years: plan to continue teaching as long as possible or until retirement, versus plan to leave sometime before this.

Continuing Teachers

Continuing teachers were defined as public school teachers who continued teaching in any public or private school from one year to the next.

Degree Enrollment

Degree enrollment was defined as a dichotomous variable during TFS years: teachers enrolled in a degree program (full or part-time) during the TFS year versus not so enrolled.

Degree Level

Degree level was defined as a dichotomous variable during SASS years: teachers who had earned a masters degree or higher, versus teachers who had earned a bachelors degree or less (including no degree).

Dependent Change

Dependent change (trichotomous) was defined as a three-category change variable from the SASS to the TFS year in which teachers were classified according to the status of their dependents as follows: change in dependent child from none in SASS year to one or more in TFS year, change in dependent child from one or more in SASS year to none in the TFS year, versus all other dependent child status.

Earned Recent Degree

Earned recent degree was defined as a dichotomous variable during TFS years: teachers who earned a college degree during 12-month period prior to a TFS administration versus no such degree earned.

Employment Change

Employment change for teachers from a SASS to TFS year was defined as a dichotomous variable: changed from part to full-time employment (in or out of education) versus any other employment status.

Employment Status

Employment status was defined as a dichotomous variable during SASS years. A public school teacher's employment status can be (a) regular versus irregular (i.e., as an itinerant or long-term substitute teacher), and (b) full or part time. Teachers who have regular full-time jobs are defined as regular full-time teachers. All other teachers (i.e., those with irregular and/or part-time jobs) are defined as irregular/part-time teachers. Individuals who are appointed as full-time regular teachers are assumed to have the best jobs in terms of stability, pay, and prestige, while teachers who have irregular and/or part-time appointments are assumed to have less desirable jobs. [Short-term substitute teachers, student teachers, teachers aides, and other school staff members were not defined as teachers.]

Exit Attrition

Exit attrition was defined as public school teachers (K through 12) in one year who did not continue as teachers in either public or private schools (K through 12) the following year. Since the focus is on public school teachers grades K through 12, such teachers who switched to pre-kindergarten the following year were included in exit attrition, as well as those who left the ranks of employed teachers entirely. If transfers to pre-K are not classified as exit attrition, slightly lower exit attrition percentages are obtained (Bobbitt, Leich, Whitener, & Lynch, 1994). See also voluntary vs. involuntary leavers.

Extra Pay

Extra pay was defined as a dichotomous variable during TFS years: teachers who received any earned income in addition to academic base year salary for teaching from any source during the school year, versus teachers who had no such income.

Extra Hours (Other)

Extra hours (other) was defined as a dichotomous variable during SASS years: teachers spent at least seven out-of-school hours per week on school related activities not involving student interaction versus less than seven such hours.

Follow-Up Change Variables

See Teacher Follow-Up Variables.

Follow-Up Status Variables

See Teacher Follow-Up Variables.

Full-Time Teachers

See Employment Status.

Fully Certified vs. Partly Certified Teachers

Most public school teachers are fully certified in their main teaching assignment as defined by holding a regular or standard certificate, an advanced professional certificate, or a probationary certificate (a certificate for teachers who have satisfied all requirements for a regular certificate except for completing a probationary period). All teachers lacking in this basic qualification for teaching are classified as partly certified in their main teaching assignments.

Goodness-of-Fit (GOF) Test (χ^2)

The Hosmer-Lemeshow Goodness-of-Fit (GOF) statistic (χ^2) of whether the frequencies predicted by a logistic regression model differ significantly from expected frequencies. The model is said to have a good fit to the data if the χ^2 is not statistically significant at $p < 0.05$ level. See also the text, *Applied Logistic Regression*, by Hosmer and Lemeshow (1989).

Income Change (Trichotomous)

Income change (trichotomous) from a SASS to TFS year was defined as a three-category variable in which teachers were classified according to their total family income as follows: family income increased, family income decreased, versus no change.

Indicator Variables

Dichotomous predictor variables are also called indicator variables, with one level designated as the reference category (code = 0), and the other level a comparison category (code = 1). In addition, a continuous variable such as age can be blocked into K ordered categories (e.g., the first, second, third, and fourth quartiles). Instead of analyzing such a categorized variable as continuous, it can be analyzed as a series of (K - 1) dichotomous variables, with (K - 1) of the categories being compared with the remaining category designated as the reference category. In this example, the first age quartile might be designated as the reference category (code = 0). The second (code = 1) vs. the first age quartile defines one indicator variable, the third (code = 1) vs. the first age quartile defines a second indicator variable, and the fourth (code = 1) vs. the first age quartile defines a third indicator variable. Thus, the association of the age factor (when so blocked into K ordered categories) with a dichotomous dependent variable can be analyzed as a set of three dichotomous indicator variables providing *beta* coefficients for each indicator variable and associated odd ratios for comparing each of the (K - 1) categories with the reference category. Since the age factor represented by the three indicator variables includes an age category for each member of the sample, no reduction of sample size occurs in using indicator variables. Similarly, a set of indicator variables

can be constructed for any multilevel categorical variable (of either the nominal or continuous types). Such categorical variables will include (K - 1) indicator variables, where K equals the number of levels of the categorical variable.

Involuntary Leavers

See Voluntary vs. Involuntary Leavers.

Involuntary Movers

See Voluntary vs. Involuntary Movers.

Irregular Teachers

See Employment Status.

Irregular/Part-Time Teachers vs. Regular/Full-Time Teachers

See Employment Status

Leavers

Teachers who leave the ranks of employed teachers (K through 12) from one year to the next are called Leavers. See Exit Attrition.

Logistic Regression

A type of regression specifically designed for analyzing data with a dichotomous dependent variable and one or more independent variables. Independent variables may be either continuous or categorical. See also the text, *Applied Logistic Regression*, by Hosmer and Lemeshow (1989).

Logistic Regression Analysis Stages

In analyzing the relationship between predictor variables and school attrition variables by logistic regression, all predictor variables were classified into one of five ordered categories termed "stages" as follows: (a) situational variables, (b) teacher characteristic variables, (c) teacher working condition variables, (d) teacher follow-up variables, and (e) teacher career judgments. As described in the section on Data Analysis Methods of Appendix A, these five categories of variables were analyzed in stages.

Main Teaching Assignment (MTA)

The main teaching assignment of a teacher was defined as a teacher's selection of one of 54 subject matter assignment options provided by the Public School Teacher Questionnaire of SASS (excluding prekindergarten), 11 of which were defined as Special Education and the remaining 43 of which were classified in this study as General Education.

Major/Minor in MTA

Major/minor in MTA was defined as dichotomous variable during SASS years: teachers who had earned any degree at the bachelors or higher level with a major or minor field of study that corresponded with the subject matter of their main teaching assignment, versus teachers whose majors or minors did not so correspond. See Main Teaching Assignment.

Marital Change (Trichotomous)

Marital change (trichotomous) from a SASS to TFS year was defined as a three-category variable in which teachers were classified according to their marital status as follows: unmarried to married, all other marital status change, versus no change.

Marital Status (Trichotomous)

Marital status (trichotomous) was defined as a three-category variable during SASS years in which teachers were classified as follows: married, previously married, versus never married.

Migrant Teachers

Migrant teachers were defined as public school teachers who (a) transferred or moved to a different public school in a different district, or (b) to a private school teaching position from one year to the next. See also Reassignment of Teachers, and Movers.

Movers

Continuing teachers who transfer as teachers from one school to a different school are called Movers. See also School Transfer, Migrant Teachers, and Reassignment of Teachers.

Odds Ratio (OR)

General: The odds ratio (OR) is defined as the chances (i.e., odds) of one event (e.g., Event A) to the odds of a different comparison event (e.g., Event B). The odds of an event are defined as the probability of the event (p) divided by ($1 - p$). An OR is the ratio of the odds of an Event A ($p/(1-p)$ to the odds of an event B ($p/(1-p)$. Consequently, ORs can range from a lower limit of 0.00 to an upper limit of infinity. An OR is an indicator of the strength of association between two binary variables.

OR > 1.00: An OR > 1.00 means that the odds of an Event A are greater than the odds of an Event B. For example, suppose the proportion of continuing teachers who are fully certified (as contrasted with being partly certified) is 0.95 (an Event A). Next suppose the proportion of entering teachers who are fully certified is 0.80 (an Event B). The ratio of the odds (OR) of this Event A [$p/(1-p)$,or .95/(1-.95) = 19] to the odds of this Event B [$p/(1-p)$, or .80/(1-.80) = 4)] is therefore 19/4, or 4.75. This means that the chances (odds) of a continuing teacher being fully certified are almost five times higher (OR = 4.75) than the chances (odds) of an entering teacher being fully certified. OR = 1.00: An OR = 1.00 means that the odds of an Event A are equal to the odds of an Event B.

OR < 1.00: An OR < 1.00 means that the odds of an Event A are less than the odds of an Event B. For example, suppose that the ratio of the odds of a continuing teacher being a female (an Event A) to the odds of an entering teacher being a female (an Event B) is 0.50 (OR = 0.50). This means that the odds of being a female continuing teacher are only half as great as the odds of being a female entering teacher. By computing the reciprocal of an OR < 1.00 such as this (i.e., 1.00/.50 = 2.00), it can be converted to the odds of the more likely event (this Event B) to the less likely event (this Event A). In this example, the converted OR = 2.00 means that the chances of an entering teacher being a female instead of a male are twice as great as the same odds for continuing teachers. Similarly, to compare the magnitude of an OR < 1.00 for one predictor variable on the same metric with the magnitude of an OR > than 1.00 for a different predictor variable, compute the reciprocal of the OR < 1.00 just for comparison purposes.

Partly Certified Teachers

See Fully Certified vs. Partly Certified Teachers

Part-Time Teachers

See Employment Status.

Phases of Logistic Regression Analysis

See Logistic Regression Analysis Phases

Public School Migrant Teachers

Public school migrant teachers were defined as public school teachers in one year who transferred to a teaching position in a different public school or in a private school (either in- or out-of-state) the following year.

Race/Ethnicity

Race/ethnicity was defined as a dichotomous variable during SASS years: teachers who were White (non-hispanic), versus all minority teachers.

Ratio of the Odds

See Odds Ratio.

Reassignees

See Reassignment of Teachers.

Reassignment of Teachers

Reassignment of teachers was defined as the transfer of public school teachers from one school to a teaching position to another school within the same school district from one year to the next. School transfer within a district could be either voluntary or involuntary. See also Migrant Teachers, and Movers.

Region

Region was defined as four areas of the United States. The four areas defined by clusters of states were as follows:

West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia

Midwest: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin

Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont

Regular Teachers

See Employment Status.

Regular/Full-Time Teachers

See Irregular/Part-Time Teachers

Retention

See School Retention of Teachers.

Salary Change (Trichotomous)

Salary change (trichotomous) from a SASS to TFS year for continuing teachers was defined as a three-category variable in which teachers were classified according to their academic year base salary as follows: salary increased, salary decreased, versus no change.

Salary (Quintiles)

The academic year base salary of teachers in dollars during the SASS year was converted to ranked quintiles for each of the three SASS years. The upper and lower limits for each of the quintile categories for the 1993-94 school year are shown in Tables 18 and 22.

SASS/TFS Wave (Trichotomous)

SASS/TFS wave (trichotomous) was defined as a three-category continuous variable in which three SASS/TFS administrations were classified by pairs of survey years (the first year of a pair for SASS, the second for TFS) as follows: 1993-95, 1990-92, versus 1987-89.

School Attrition

School attrition was defined as teachers (K through 12) employed in a public school in one year who were not employed in the same school the following year. School attrition was composed of two types: school transfer of teachers and exit attrition of teachers. See also the definitions of these two terms.

School Migration of Teachers

See Migrant Teachers.

School Problems

A series of seven possible school problems were defined as dichótomous variables during SASS years. In short, these possible problems were student absenteeism, student physical conflicts, student substance abuse, student misbehavior, student possession of weapons, principals not enforcing school rules, and teachers not enforcing school rules. Except for "principals not enforcing school rules," the bivariate relationships of each of these problems (at a moderate or serious level versus at minor or nonexistent level) with school attrition dependent variables were not statistically significantly, and were not analyzed further. The "principal" variables was coded as follows: principal doesn't enforce rules (1) vs. principal enforces rules (0).

School Reassignment of Teachers

See Reassignment of Teachers.

School Retention of Teachers

School retention was defined as public school teachers in one year who continued as teachers in the same school the following year.

School Transfer of Teachers

School transfer was defined as public school teachers in one year who transferred to a teaching position in a different public or private school the following year, either in- or out-of-state. School transfer is the sum of school reassignment and school migration of teachers. See also voluntary vs. involuntary movers.

Sector

Sector refers to the dimension of public versus private schools. Public schools are in the public sector, while private schools are in the private sector.

Sex

Sex was defined as a dichotomous variable: teachers who were female versus teachers who were male.

Situational Variables

Situational variables were a stage (i.e., category) of contextual predictor variables based on how teaching appointments were situated in terms of level, teaching field, community type, and region. In addition, the SASS/TFS Wave variable was included in this category.

Stay School (SASS)

Stay school was defined as a dichotomous variable during SASS years: teachers expect to continue teaching in the same school during the next year, versus do not so expect.

Stay School (TFS)

Stay school was also defined as a dichotomous variable during TFS years: teachers expect to continue teaching in the same school during the next year, versus do not so expect.

Split Assignment

Split Assignment was defined as a dichotomous variable during SASS years: teachers responsible for teaching courses in more than one main assignment field versus teaching courses in only one main teaching assignment field.

Stages

See Logistic Regression Analysis Stages

Stayers

Continuing public school teachers who stay as teachers in the same school from one year to the next are called Stayers. See School Retention of Teachers

Teacher

In keeping with the SASS definition, a teacher was any individual employed either full-time or part-time at a school who reported their main assignment as teaching in any grade(s) K - 12, including itinerant teachers and long-term substitutes. Excluded from this definition of a teacher were individuals who identified their main assignment as a pre-kindergarten teacher, short-term substitute, student teacher, teacher aide, and a non-teaching specialist of any kind.

Teacher Attrition

See School Attrition

Teacher Career Judgments

Teacher career judgments were a stage (i.e., category) of predictor variables based on responses of teachers to questionnaire items (during the SASS year) asking about whether they would elect to go into teaching again if they could start over, about their plans for the following year, and about how long they expect to continue teaching.

Teacher Characteristic Variables

Teacher characteristic variables were a stage (i.e., category) of predictor variables based on attributes specifically of teachers such as their demographic characteristics, their qualifications for being employed as teachers, and their career path expectations.

Teacher Control

Teacher control was defined as a composite dichotomous variable during SASS years: teachers reporting a high degree of control in his/her classroom averaged over various student instruction, assessment, and discipline factors, versus teachers who reported only moderate or low control over such classroom factors.

Teacher Follow-Up Variables

Teacher follow-up variables were a stage (i.e., category) of predictor variables based on (a) employment considerations during a TFS year, and (b) change variables from a SASS to a TFS year, such as change in dependence status, marital status, certification status, employment status, income, etc.

Teacher Influence

Teacher influence was defined as a composite dichotomous variable during SASS years: teachers reporting a high degree of influence over school policy averaged over various curriculum, student discipline, student grouping, and in-service programs versus teachers who reported only moderate or low influence over such school policy factors.

Teacher Migration

See Migrant Teachers.

Teacher Retention

See School Retention of Teachers.

Teacher Transfer

Teacher transfer is a generic term defined as teachers who transfer from one school to another, or to a different main teaching assignment, or both, from one year to the next. See School Transfer of Teachers and Teaching Assignment Transfer.

Teacher Turnover

Teacher turnover is a generic term encompassing the following three major changes in a teacher's status from one year to the next: School Transfer of Teachers (Movers), Teaching Assignment Transfer (Switchers), and Exit Attrition (Leavers).

Teacher Working Conditions

Teacher working conditions were a stage (i.e., category) of predictor variables based on attributes of the work environment of teachers including their employment status, salary, teacher classroom control, and minority enrollment in the school to which they were assigned.

Teaching Assignment Transfer

Teaching assignment transfer was defined as continuing teachers who switch (either voluntarily or involuntarily) from one main teaching assignment to a different main teaching assignment (e.g., from mathematics to chemistry) from one year to the next, either within or between cognate areas. See also Switchers.

Teaching Breaks (Trichotomous)

Teaching breaks (trichotomous) was defined as a three-category variable in which the number of previous breaks in teaching service of one year or more were reported during SASS years as follows: two or more prior breaks in teaching service, one break, versus no such breaks.

Teaching Experience (Quintiles)

Teaching experience in years (with both full and part-time years counted as one year) in public and private schools combined was converted to ranked quintiles for the three SASS years combined (1987-88, 1990-91, and 1993-94). The upper and lower limits for each of the quintile categories for the three SASS years combined are shown in Tables 17 and 21.

Teaching Field

Teaching field was defined by four general categories of teaching that represented groupings of related main teaching assignments (see Main Teaching Assignments). The 1990-91 and 1993-94 SASSs recognized 53 main teaching assignment fields in grades K - 12, including one termed "all others." These 53 main teaching assignments were grouped into four teaching fields as follows:

General Elementary: Kindergarten, general elementary, bilingual education, reading.

General Secondary: American Indian/Native American studies, art, basic skills and remedial education, computer science, dance, drama/theater, English/language arts, English as a second language, gifted, journalism, mathematics, military science, music, philosophy, religion, social studies/social science (including history), French, German, Latin, Russian, Spanish, other foreign language, biology/life science, chemistry,

geology/earth science/space science, physical science, physics, general and all other science, all others.

Other Education: Physical education, health education, home economics, accounting, agriculture, business/marketing, health occupations, industrial arts, trade and industry, technical, other vocational/technical education.

Special Education: Special education (general), emotionally disturbed, mentally retarded, speech/language impaired, deaf and hard-of-hearing, visually handicapped, orthopedically impaired, mildly handicapped, severely handicapped, specific learning disabilities, other special education.

Teaching Level

Teaching level (i.e., the level at which a teacher taught) was defined during SASS years as a dichotomous variable based on the grade(s) a teacher was assigned to teach instead of on the type of schools in which they taught: secondary teaching level teachers (mostly 9th through 12th grades) versus elementary level teachers (mostly K through 6th grades). Teaching level was coded by NCES based on a complex set of criteria that assigned 7th and 8th grade teachers to either the secondary or elementary level depending on an algorithm described by Henke, Choy, Geis, & Broughman (1996, Appendix C, p. 201).

Turnover of Teachers

See Teacher Turnover

Voluntary vs. Involuntary Leavers

The distinction between voluntary versus involuntary leavers was based on reasons given for leaving during TFS years. Voluntary leavers were defined as those who reported leaving for the following reasons: family or personal move, pregnancy/child rearing, to pursue another career, for better salary or benefits, to take courses for improving career opportunities either in or out of the field of education, to take a sabbatical break, and dissatisfied with teaching. Involuntary leavers were defined as those who reported leaving for the following reasons: retirement, health, and school staffing action.

Voluntary vs. Involuntary Movers

The distinction between voluntary versus involuntary movers was based on reasons given for moving during TFS years. Voluntary movers were defined as those who reported moving for the following reasons: family or personal move, for a better salary or benefits, for a better teaching assignment, and dissatisfied with the school. Involuntary movers were defined as those who reported moving for school staffing action.